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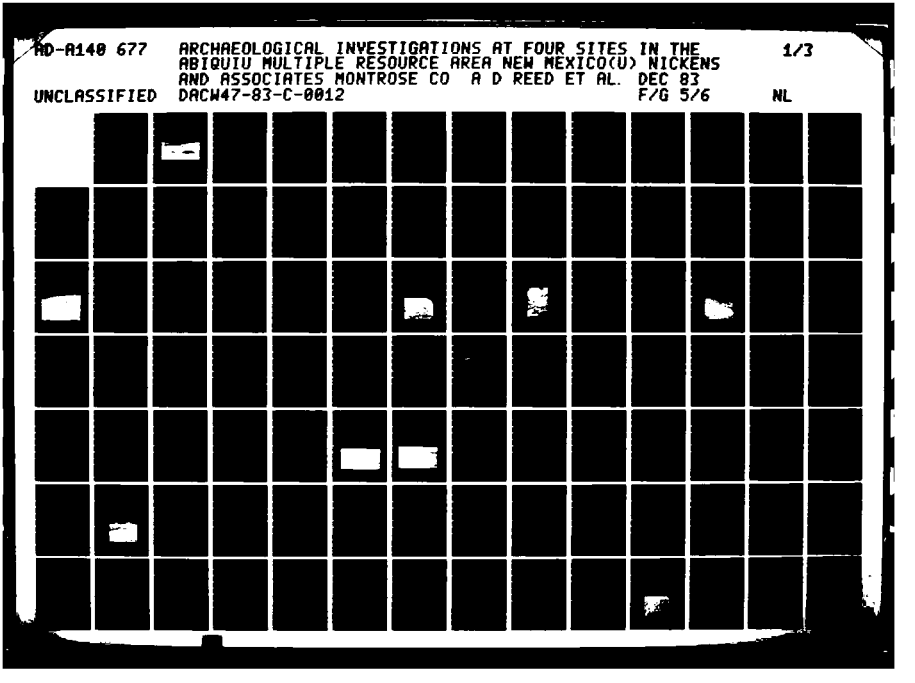

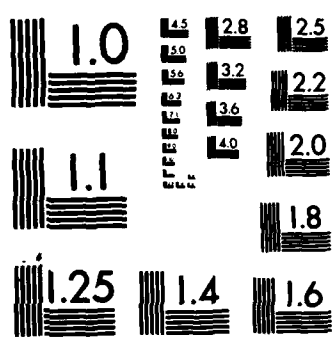

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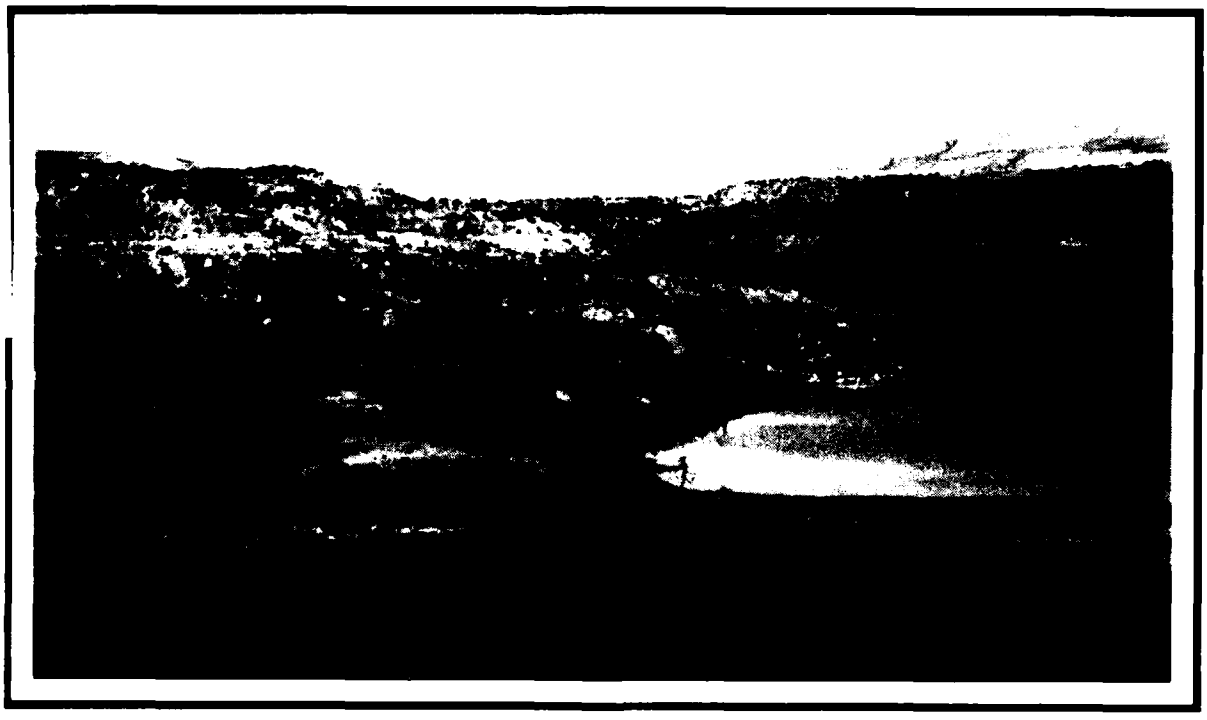
ARCHAEOLOGICAL INVESTIGATIONS AT FOUR SITES IN THE ABIQUIU MULTIPLE RESOURCE AREA NEW MEXICO

By
ALAN D. REED
and
GORDON C. TUCKER, JR.



Prepared for the Corps of Engineers, Albuquerque District New Mexico

Submitted by Nickens and Associates

ARCHAEOLOGICAL INVESTIGATIONS AT FOUR SITES IN THE ABIQUIU RESERVOIR MULTIPLE RESOURCE AREA, NEW MEXICO

by

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United States Army Corps of Engineers
Albuquerque District

December 1983

FOREWORD

The Abiquiu Dam and Reservoir were completed in 1963 by the U.S. Army Corps of Engineers to provide a variety of services to northern New Mexico. The facility provides flood and sediment control for the Rio Chama Valley, as well as electricity, recreation, and water conservation for a much broader area. The area of operation for the reservoir, termed the Abiquiu Reservoir Multiple Resource Area, is administered by the Corps. To date, some 343 archaeological sites, have been identified within the Multiple Resource Area, most of which are considered eligible for the National Register of Historic Places. Many of these sites are located near the shoreline of the reservoir, and have suffered adverse impacts due primarily to episodic fluctuations in the lake level as floodwaters are stored and released.

In December of 1982, the U.S. Army Corps of Engineers began raising the lake level to accommodate the water needs of the City of Albuquerque. The City requested the storage of 48,200 acre feet, which will inundate all lands below an elevation of 6185 feet. Four important cultural resources were to be adversely impacted by this action, and so to comply with existing historic preservation legislation, the Corps determined that a data recovery program needed to be implemented to collect data that would otherwise be lost. The four sites, LA 25322, 25454, 25466, and 25469 had been previously impacted by past inundation, but yet retained the potential to yield valuable scientific information. Consequently, the Corps of Engineers contracted with Nickens and Associates, Montrose, Colorado, to conduct the necessary salvage operations (Contract No. DACW47-83-C-0012). The report by Alan D. Reed and Gordon C. Tucker, Jr. describes the laboratory and field tactics utilized to collect specific lines of data. The report details primarily systematic surface artifact collection and subsurface excavation tasks, and the analyses associated with these studies. Surface artifact analysis resulted in the collection of a representative sample of artifacts, in a manner preserving provenience information. Subsurface excavation resulted in the complete excavation of two Piedra Lumbre Phase Navajo structures and several extramural excavation units at LA 25322, a substantial portion of an Hispanic house and a sample of outbuildings and extramural areas at LA 25466, and a small sample of the areas covered by broad lithic scatters at LA 25454 and 25469. Ancillary materials, such as radiocarbon tree-ring, obsidian, faunal, pollen, and macrofloral specimens were collected during the excavations and were processed. A considerable amount of primary field data was amassed as a result of the project, all of which will be placed on file with the Corps of Engineers. These materials include field notes, daily logs, maps, photographs, and previously recorded site data.

The project resulted in the preservation of a considerable amount of data on the four sites that would have otherwise been lost to inundation impacts. The analysis of the collected data has, to some degree, furthered our understanding of historic and prehistoric utilization of the Rio Chama valley, in terms of technology, subsistence practices, chronology, and other aspects of human behavior.

Paul R. Nickens

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ABSTRACT

In December of 1982, personnel from Nickens and Associates of Montrose, Colorado, conducted field investigations at four sites in the Abiquiu Reservoir Multiple Resource Area in Rio Arriba County, New Mexico. The work was conducted under contract with the U.S. Army Corps of Engineers, which operates Abiquiu Dam and Reservoir, and is responsible for the cultural resources within the Multiple Resource Area. Field investigations were salvage in nature; they were an attempt to mitigate the adverse impacts of raising the level of Abiquiu Reservoir, resulting in the inundation of all or portions of four important cultural resources. The raising of the lake level was a result of the City of Albuquerque requesting the storage of 48,200 acre feet of water. The four cultural resources were LA25322, a structural site evincing a possible Piedra Lumbre Phase occupation and later components too, LA25454 and LA25469, large lithic procurement and processing sites, and LA25466, an abandoned Hispanic farm dating to the late 19th or early 20th century. Field tasks included systematic analysis and collection of surface artifacts, and various degrees of excavations. Tasks were directed at recovering important archaeological data for conservation, and for analysis and perhaps insight into long-range human adaptive strategies in the Abiquiu Reservoir area.

CHAPTER I

INTRODUCTION

Project Background

In late November, 1982, the U.S. Army Corps of Engineers, Albuquerque District, contracted with Nickens and Associates of Montrose, Colorado, to conduct archaeological investigations at four sites in the Abiquiu Reservoir Multiple Resource Area. The four sites, Laboratory of Anthropology (LA) numbers 25322, 25454, 25466, and 25469 were to be inundated by January of 1983 as a result of raising the lake level to accommodate the water needs of the City of Albuquerque. Portions of the four sites had been previously temporarily inundated, but they still retained some degree of archaeological integrity. The primary objective of this project, then, was to salvage important archaeological data and materials at these sites prior to further adverse impacts.

The four sites are quite diverse, and required differing data recovery strategies. Sites 25454 and 25469 are extensive lithic scatters thought to represent short-term occupation and lithic reduction areas by Archaic and probably subsequent stages or traditions. Collection and processing of raw stone materials for eventual use as stone tools are thought to be the primary activities represented. No definite structures were detected at these sites. Site 25322 is a large site with numerous masonry structures and a scatter of lithic and ceramic artifacts. The site appears to be similar to the previously excavated and described Cerrito Site (Schaafsma 1979), and so may represent the Piedra Lumbre phase of the Navajo tradition. Habitation and possibly sheep-herding may have occurred at this site. The final site investigated, Site 25466, represents Hispanic ranching and habitation activities, and possibly prehistoric utilization as well. A scatter of lithic flakes are present, along with a corral, the foundation of a small outbuilding, and the remains of a masonry and jacal house.

Nickens and Associates conducted the field investigations at the four sites between December 3 and 13, 1982, with a crew of 12 people. The field and analytic phases were directed by Alan D. Reed, Co-Principal Investigator for the project, who was assisted by crew leaders Diana Christensen and Dr. Gordon C. Tucker, Jr. Dr. Paul R. Nickens, Principal Investigator for Nickens and Associates, was in general charge of the project.

The results of the data recovery program are presented in subsequent sections of this report. The sites are discussed separately.

ENVIRONMENTAL BACKGROUND

Location

The four sites with which this report is concerned are located along the shoreline of Abiquiu Reservoir in Rio Arriba County, New Mexico. The reservoir is formed by a U.S. Army Corps of Engineers dam across the Rio Chama, a major river in northcentral New Mexico and a tributary to the Rio Grande. The reservoir is located approximately six miles northwest of the town of Abiquiu, or approximately 35 miles northwest of Espanola. Santa

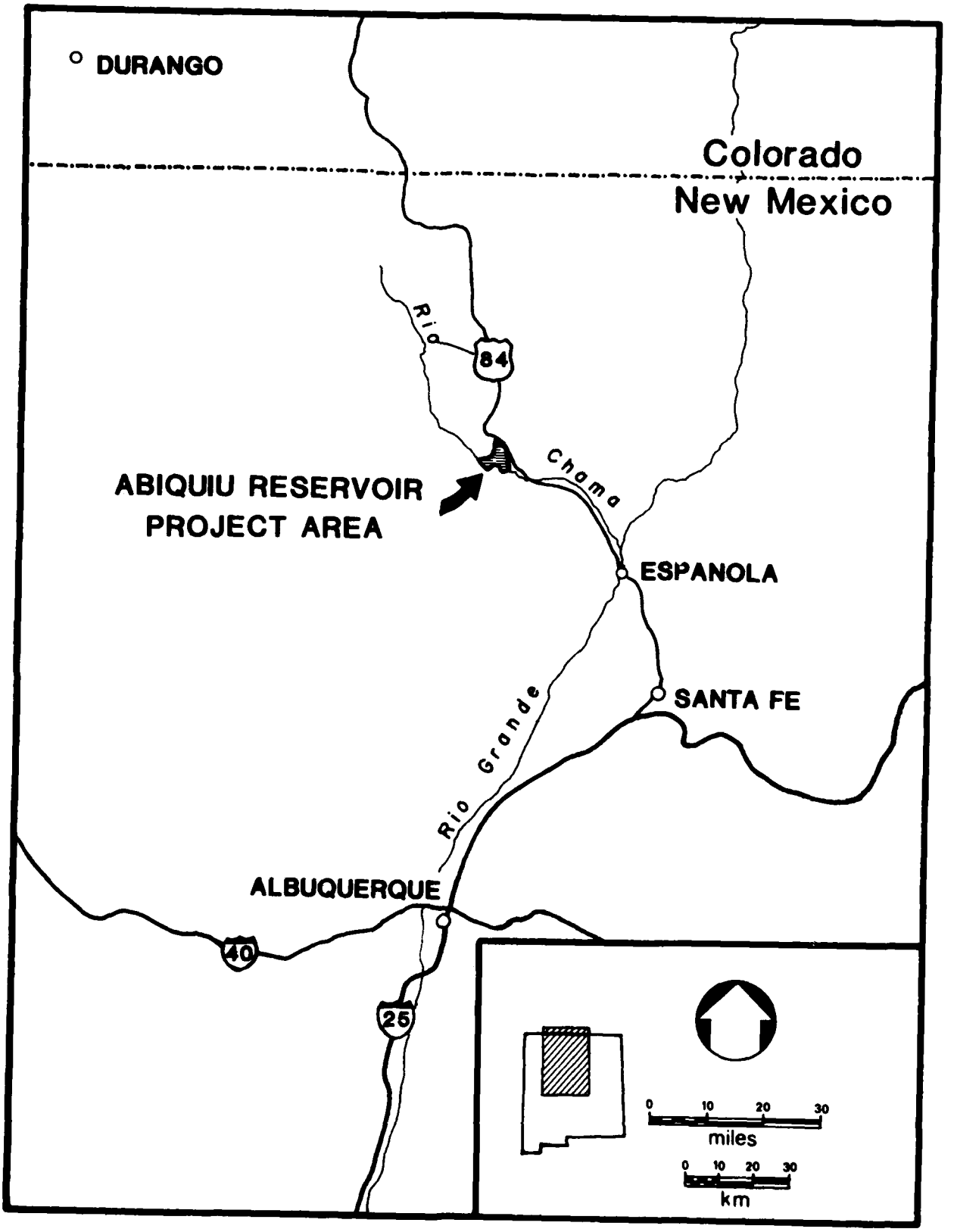

Figure 1. Map showing the general location of the project area.

Fe is approximately 60 miles to the southeast. Access to the reservoir is via U.S. Highway 84 (Fig. 1).

Topography and Geology

Abiquiu Reservoir is situated along the eastern margin of the Colorado Plateau physiographic province. As a consequence, the area is characterized by relatively high elevation, a semi-arid climate, and extensive horizontal sedimentary formations which are dissected to form mesas and canyons. The earliest exposed formation in the vicinity of the reservoir is the Permian-aged Cutler formation. It consists of dark red shales and sandstones, and is easily visible near the mouth of the Rio Puerco. Atop the Cutler formation is the Chinle formation, of Triassic age. This sandstone formation forms the floor of the central valley and the bluffs along the Rio Chama (Schaafsma 1979). The upper portion of this formation consists of variegated shales, which have eroded severely, exposing the underlying sandstones. These shales form scenic badlands along the edge of the valley, notably near the Ghost Ranch and U.S. Highway 84. The canyon walls above the valley are comprised partially of Jurassic-aged sandstones such as the Entrada formation. Quaternary loam and gravel terraces are present along the Rio Chama. These contain high quality cherts, which were exploited by aboriginal peoples.

Dominating the landscape in the vicinity of the Abiquiu Reservoir is Cerro Pedernal in the Jemez Mountains. This large flat-topped mountain is just south of the reservoir, and is 9,862 feet high. Also visible is Polvadera Peak, which attains 11,232 feet elevation. The Jemez Mountains are the result of volcanic activity.

Climate

Abiquiu Reservoir is located in a semi-arid climatic zone. Precipitation ranges from 10 to 14 inches (254-356 mm) per year and the temperature averages 73° F in the summer and 35° F in the winter. The length of the frost-free growing season is between 140 and 160 days.

Flora and Fauna

The vegetation present in the Abiquiu Reservoir area is dependant upon other environmental factors such as elevation, slope, exposure and soils. Communities range from short grass prairie to pinyon-juniper woodlands. Common species include pinyon pine (Pinus edulis), juniper (Juniperus monosperma), various grasses, snakeweed (Gutierrezia sarothrae), rabbitbrush (Chryothamnus nauseosus), four-winged saltbush (Atriplex canascens), cocklebur (Xanthium sacaratum), sagebrush (Artemesia spp.), lupine (Lupinus aduncus), sunflower (Helianthus spp.), yucca (Yucca glauca) and various cacti (Opuntia spp.).

Fauna common in the area include mule deer (Odocoileus hemionus), Audubon cottontail (Sylvilagus auduboni), beaver (Castor canadensis), coyote (Canus latrans), black-tailed jackrabbit (Lepus californicus), rock squirrel (Citellus variegatus), and prairie dog (Cynomys spp.). Birds present include various raptors, burrowing owl (Speotyto cunicularia), mourning dove

(Zenaidura macroura), Cassin kingbird (Tyrannus vociferans), common nighthawk (Chordeiles minor), and broad-tailed hummingbird (Selasphorus platycercus).

Culture History

The date of mans' first entry into the New World has long been a topic of debate among archaeologists. Some, such as MacNeish (1976), have concluded that human occupation of the New World may have begun approximately 70,000 ± 30,000 years ago. While there appears to be growing evidence of a Pre-Clovis manifestation, sites of such antiquity are extremely rare. The earliest peoples for whom areal archaeological data exists represent the Paleo-Indian Stage. Considerable research has been conducted at Paleo-Indian Stage sites, resulting in the definition of three traditions, which in some areas are divided into even more specific synthetic units. The three traditions, termed the Llano, Folsom and Plano traditions, represent efficient and enduring adaptations to terminal Pleistocene environments, with an apparent emphasis upon large game procurement. Plant resources were probably also an important part of the diet. People of the Paleo-Indian Stage probably practiced transhumance, a non-sedentary lifestyle in which relatively small bands moved from maturing resource to maturing resource on a seasonal basis. The material culture reflects the mobile, big-game hunting lifestyle of the Paleo-Indians; tool kits are generally suited for animal killing and processing, and habitation structures are uncommon or unknown. The Paleo-Indian Stage on the Colorado Plateau extends from approximately 10,000 to 5500 B.C.

Sites yielding Paleo-Indian Stage materials are sparse in the vicinity of Abiquiu Reservoir. Presently, only four sites with Paleo-Indian artifacts have been recorded in the area, and most of these occur on sites with later stages represented. Occupation of the Piedra Lumbre Valley by Paleo-Indians is thought to have been sporadic and not intensive.

At approximately 5500 B.C., an apparent shift in cultural adaptations occurred in the New World, evidently in response to changing climatic conditions. By this date, terminal Pleistocene environments had been supplanted by more modern conditions. In terms of subsistence, the shift represented a trend away from reliance upon big game towards a more diversified economy. Floral resources became increasingly utilized, as evinced by the greater numbers of grinding stones discovered in archaeological sites post-dating 6000 B.C. (Cohen 1977). The shift to what is termed the Archaic Stage constituted a more intensive and efficient utilization of space. Populations evidently increased (Cohen 1977), and adapted to local environments, resulting in more regional variation. Artifact types characteristic of Archaic Stage sites included large stemmed and indented base projectile points, certain styles of lanceolate projectile points, and large side-and corner-notched projectile points. Also common to Archaic sites are one-hand manos and metates.

Cynthia Irwin-Williams has divided the Archaic Stage of northwestern New Mexico into a number of phases, based upon data generated by survey and limited test excavations. The various phases make up Irwin-Williams' (1973) Oshara Tradition, the Four Corners region manifestation of the Archaic Stage, and the alleged precursor of the Anasazi culture. The first

two phases of the Oshara Tradition are the Jay phase (5500 to 4800 B.C.) and the Bajada phase (4800 to 3200 B.C.). The material culture associated with these phases is so distinct from the Paleo-Indian tool assemblages that Irwin-Williams (1973:4) discounts any generic relationship between the two. The Jay and the Bajada phases were characterized by a subsistence pattern based on extensive foraging and hunting, and a relatively small population. Following the Bajada phase is the San Jose phase (3000 B.C. to 1800 B.C.), which is marked by an increase in the effective moisture in the Southwest. This phase is characterized by changes in settlement and subsistence patterns, allowing for a more intensive and systematic exploitation of resources. Population is believed to have increased during the San Jose phase. The Armijo phase (1800 B.C. to 800 B.C.) succeeded the San Jose phase, and witnessed additional changes in land use patterns, as maize agriculture was introduced, although on a limited basis, into the subsistence pattern. The exploitation of maize permitted enough food surplus to permit seasonal population aggregations, which in turn facilitated the development of various social interaction spheres. The En Medio phase (800 B.C. to A.D. 400) and subsequent phases of the Oshara Tradition mark the full transition from an Archaic lifestyle to the sedentary lifestyle of the Anasazi. The En Medio phase incorporates the Basketmaker II Period of the Anasazi culture, which will be discussed below.

Sites attributable to the Archaic Stage are common in the vicinity of Abiquiu Reservoir. Most of the projectile points of Archaic Stage affinity and radiocarbon dates processed so far indicate that Archaic occupation of the Chama Valley was most intense following 3000 B.C. (Schaafsma 1977).

The advent of the Formative Stage at approximately A.D. 1 marks a major change in cultural adaptations over much of the Southwest, as the pattern of seasonal wandering in search of a variety of hunted and gathered foodstuffs gave way to a sedentary lifeway emphasizing the cultivation vation of corn, beans, and squash. In the Four Corners area, the Formative Stage is manifest as the Anasazi Tradition. For a variety of environmental and cultural reasons, as yet largely undefined, the Anasazi did not permanently inhabit the Piedra Lumbre Valley until the early fourteenth century, and then only for a brief period of time. Between the Basketmaker II and Pueblo IV periods the area appears to have been infrequently utilized by the Anasazi peoples. No undisputed residential structures of Anasazi construction have been discovered in the project area before the Pueblo IV period, although many such sites occur in the surrounding region.

Three large pueblos were constructed in the Piedra Lumbre Valley, in the early portion of the fourteenth century during the Pueblo IV period. The Palisade Ruin and the Riana Ruin, located near the Abiquiu Dam, were both inhabited for a short period of time, until approximately A.D. 1350. The Tsiping Ruin, near Canones, was occupied until the last half of the fourteenth century, when it too was abandoned. The pueblos in the Piedra Lumbre Valley are thought to represent the northernmost extension of the Tewa. Their abandonment marked a gradual retreat down the Rio Chama to their present homeland near the Rio Grande River (Schaafsma 1979). Subsequent to the abandonment of the Palisade, Riana and Tsiping pueblos, the

Piedra Lumbre Valley appears to have been utilized only on a sporadic basis for ceremonial and resource procurement purposes (Schaafsma 1979), but no habitation structures were constructed.

Following the abandonment of the Abiquiu project area by the Pueblo Indians, the Athabaskan-speaking Navajo moved into the area from their original homelands in northwestern Canada and Alaska (Spencer and Jennings et al. 1977). The time of their arrival in the Southwest is uncertain, but may date to about A.D. 1500 according to linguistic and archaeological data (Hester 1962). The Navajo Tradition is commonly divided into three phases. The Piedra Lumbre phase is the first, and spans from the time of arrival in the Southwest to A.D. 1710 (Schaafsma 1981). In this phase, the Navajo probably practiced a hunting and gathering economy, and had limited trading ties with the Pueblos.

The Navajo lifestyle changed radically as a result of the arrival of the Spanish in the Southwest. The Spanish incurred two major revolutions by the Pueblo Indians, in 1680 and 1696. The latter revolt was unsuccessful, and forced numerous Pueblo Indians to flee northward to join the Navajo. The Navajo adopted many Puebloan traits as a result of the exposure, affecting their architecture, material culture, religion and social organization. The Navajo adopted animal husbandry during this period. These changes mark the Gobernador phase, which spans from A.D. 1696 to 1745.

The subsequent Cabezon or Refugee phase spans the period from A.D. 1745 to 1812. This period was marked by increased dependence on animal husbandry and a return to certain architectural styles (Klager 1980).

Archaeological and historical investigations in the Piedra Lumbre Valley indicate an intensive occupation by Navajos. Numerous sites, many with masonry structures, lambing pens, and Rio Grande Pueblo pottery have been recorded in the area. Of particular importance is the Cerrito site, which has been excavated by the School of American Research (Schaafsma 1979). This site yielded masonry habitation structures, lambing pens, lithic and metal artifacts, Tewa pottery, and chronometric dates spanning primarily between A.D. 1640 and 1710. The site provided the basis for Schaafsma's (1979) definition of the Piedra Lumbre phase, an early and manifestation of the Navajo Tradition present primarily in the Rio Grande Valley. That the Cerrito site represents a Navajo occupation is well demonstrated by Schaafsma (1979), and is also supported by historical accounts (e.g. Schroeder 1965:54).

Intensive occupation of the Piedra Lumbre Valley by the Navajo is thought to have subsided by approximately 1710, perhaps partly due to pressure from mounted Ute raiding parties (Schaafsma 1979: Schroeder 1965). The Navajo moved into small pueblo-like structures in the upper San Juan-Canyon Largo Gobernado region, and for the subsequent 35 years, seldom ventured into the Chama Valley (Schroeder 1965). The intensity of Navajo reoccupation of the Chama Valley in the latter portion of the eighteenth century and the early nineteenth century is unknown. There are historical accounts of Navajo raids in the Abiquiu area in 1827 and 1829 (Schroeder 1965; Kutsche and Van Ness 1981), but due to Ute and Hispanic occupations, occupation may have been short-term and mobile.

Following the evident withdrawal of the Navajo from the Chama Valley in the early eighteenth century, the area was intermittently utilized by the Ute, Comanches, and Jicarrila Apache (Schaafsma 1977). The Utes were the primary group to occupy the project area, however, attracted to the area by trade with Spanish settlements such as Abiquiu. Ute utilization and occupation of the Chama Valley (cf. Schaafsma 1979) were fairly intensive between 1746 and the first portion of the 19th century. Apache and Comanche utilization of the area was more sporadic. The Jicarrila Apache appeared in the area in 1852, attracted by the Indian Agency at Abiquiu. They were moved to an area approximately ten miles west of Abiquiu on the Rio Puerco (Schaafsma 1977). Comanche presence in the area was primarily for raiding, and was largely contingent upon their varying relationship with the Utes. In 1878, the U.S. Government moved the Utes to reservations in southern Colorado, and in 1881, the Apache were moved to the Jicarilla Reservation near Dulce, New Mexico (Schaafsma 1977).

The first Spanish occupation of the region occurred in 1598 at the confluence of the Rio Chama and the Rio Grande. At that time, the Spanish requisitioned Yungue Pueblo for quarters, and renamed it San Gabriel. San Gabriel functioned as the capital of New Mexico until 1610, when Santa Fe was founded. San Gabriel was then abandoned by the Spanish. No satellite Spanish communities were apparently associated with the occupation of San Gabriel, due partially to the development of an encomienda system (Swadish 1974). Schaafsma (1979) writes that it is unlikely that the Spanish attempted to settle the Chama Valley in the seventeenth century.

Spanish settlers returned to the lower Chama Valley in early eighteenth century, near the location of San Gabriel at Chamita. By the early 1730s, Santa Rosa de Lima de Abiquiu was founded downstream of the present location of Abiquiu. Also in the 1730s, Jose de Riano, a wealthy Spaniard of Santa Fe, was provided a grazing grant in the Piedra Lumbre Valley. By 1740, cattle were grazing on this land near Canones, but the subsequent owners of the grazing grant were forced to abandon their holdings in 1745 after Ute raids (Kutsche and Van Ness 1981). Abiquiu was also abandoned due to Indian raids, to be resettled at the present site of Santo Tomas de Abiquiu in the early 1750s. In 1766, a portion of the Piedra Lumbre was again granted, for cattle grazing and defense against Indian raiders. The new landholders were able to establish themselves near Canones, and established seasonal ranchos in the Canones basin. They subsisted by raising sheep, goats, and cattle, by limited farming, by trading with the Utes and Navajos, and to some extent by hunting and gathering (Kutsche and Van Ness 1981).

The ranchers had to contend with Indian raids well into the nineteenth century and indeed they were driven out of the Canones area in 1819 and 1824 (Kutsche and Van Ness 1981). The Hispanic settlers persevered, as attested by their continued presence at Abiquiu and Canones. In the twentieth century, some have turned to wage labor for subsistence, but ranching may still be the most important economic strategy.

The Piedra Lumbre Valley is presently used primarily as rangeland for cattle, for flood control, and for recreation. The latter uses are primarily the consequence of the construction of the Abiquiu dam and reservoir in recent decades.

CHAPTER II

RESEARCH DESIGN

Previous Archaeological Work

Archaeological work in the Abiquiu area began in the 1930s with ceramic studies by H.P. Mera and Frank C. Hibben (Mera 1940) and the excavation of the Riana Ruin by Hibben (1937). Somewhat later, the Palisade Ruin, a large village with Pueblo IV affiliations, was excavated by the Museum of New Mexico in partnership with the School of American Research (Peckham 1959).

Systematic survey of the Abiquiu Reservoir area did not begin until 1974 when the School of American Research (SAR) initiated a series of research projects which continued until 1980. These projects, identified by phase, are described briefly below (Powers and Swift 1980):

* Phase I (1974) - Survey of 2057 acres below the 6180' contour line; 33 sites recorded (Schaafsma 1974, 1975).

* Phase II (1974) - Surface collections and excavations on 6 sites below the 6143' contour which were recorded during Phase I; 3 sites below 6173' contour described (Schaafsma 1975).

* Phase III (1975) - Survey of 11,574 acres between the 6180' and 6362' contours; 279 sites recorded; test excavations at 2 sites (Schaafsma 1976).

* Phase IV (1975) - Excavations on 14 sites between 6143' and 6170' contours (Schaafsma 1977).

* Phase V (1977) - Excavations at the Cerrito Site (Schaafsma 1979).

* Phase VI (1979) - Relocation and redescription of 62 sites, recordation of 4 new sites; survey of 450 acres between the 6340' and 6450' contours, 47 sites recorded and Palisade Ruin evaluated (Klager 1980).

In addition to this work, a formal study on the mechanical and chemical effects of inundation upon cultural resources was undertaken by SAR (Schaafsma 1978). An additional study was performed (Beal 1980) to collect analytical samples from previously unstudied and uninundated sites located within the maximum flood pool. One site on the Ghost Ranch was excavated in 1979 (Perret 1980). Finally, limited data recovery was completed by Nickens and Associates at 98 sites in order to formulate management recommendations for site preservation (Reed et al. 1982).

These investigations have resulted in the location and recordation of 343 prehistoric and historic sites. Test and/or controlled excavations have been conducted at approximately 25 percent of these sites. Ample information has been obtained from these investigations

to construct a scenario of regional culture history and provide insights into the lifeways of the local inhabitants.

Research Design

The primary objective of the data recovery efforts at the four sites was to preserve scientific information that would be otherwise lost with the initiation of the planned adverse impacts. The project was clearly "salvage" in nature - an attempt to recover data identified as important by analysis of previously collected data, and, to some extent, an attempt to recover data that may in the future be determined to be important. It has been repeatedly demonstrated, however, that salvage archaeology can go well beyond mere collection of data, and can address specific research questions. This section presents the types of data considered of primary importance for recovery and analysis, and the research objectives formulated to structure its analysis and synthesis. The research goals are enumerated below:

1. To recover, describe and analyze key structures, features artifacts, and ecofacts;

2. To establish a chronology for the occupations at the four sites;

3. To discern site functions and intrasite activity areas;

4. To detect paleoclimatic trends;

5. To determine subsistence practices at the four sites;

6. To assess the nature of trading networks; and

7. To determine the effects of previous inundation on certain sites.

Description of Key Features and Artifact Types

To ensure preservation of important architectural, artifactual and ecofactual information, the scope-of-work called for thorough recordation and analysis of structures, lithic and ceramic assemblages, historic artifacts, faunal remains, and ancillary materials. Investigated structures were described, photographed, and mapped in both plan view and cross section. Lithic artifacts were classified into conventional morphological/functional types for comparative purposes, and frequencies of material types were calculated. Ceramics were placed into types consistent with regional nomenclature. Historic artifacts, faunal remains, and specialized study specimens such as pollen, soil samples and charcoal were submitted to experts for analysis. Dr. Douglas D. Scott of Montrose, Colorado, analyzed the historic artifacts, and wrote a description included as a contribution to this report. Faunal analysis was conducted at the Center for Western Studies, Inc., of Flagstaff, Arizona. Palynological Analysts Inc. of Montrose studied the micro- and macrofloral remains.

Chronology

Since the development of chronological frameworks for the occupations of the four sites is a prerequisite for the successful examination of other problem areas, several dating techniques were employed. These techniques include radiocarbon determinations, obsidian hydration analysis, tree-ring dating, and artifact cross-dating. Charcoal was found in sufficient quantities for dating purposes at only two sites, LA 25322, the probable Navajo site, and LA 25466, the Hispanic habitation site. Due to the cost of radiocarbon dates and the presence of beams evidently suitable for dendrochronological determination at the Hispanic site, a charcoal sample was processed only for LA 25322. It was originally proposed that two samples would be analyzed for this site, but one was found to be of insufficient quantity to likely yield a reliable date. The single suitable radiocarbon sample was submitted to Beta Analytic of Coral Gables, Florida. Obsidian artifacts were present at each of the four sites. A total of 35 flakes, representing each site, was sent to Fred W. Trembour of the Branch of Isotope Geology, U.S. Geological Survey, in Denver, for analysis. Refractive Index studies and measurement of hydration rinds resulted in these artifacts being relatively and chronometrically dated. As mentioned, suitable tree-ring specimens were found at LA 25466, the Hispanic site. Unburned juniper beams were found in the fill in one of the rooms of the habitation structure, permitting the time of construction to be determined. Eight specimens were sent to the University of Arizona in Tucson for analysis. Artifact cross dating, was made possible by the recovery of diagnostic projectile points and ceramics, which were compared to similar artifacts described in the literature of the region.

Attempts to determine the cultural affiliation of the identified archaeological components were integrated in the discussion of site chronology.

Site Function

All artifacts recovered were analyzed and classified into conventional tool typologies, based upon morphological attributes and general wear patterns. The resulting artifact types hopefully reflect the types of activities represented in the sites' components. Such analysis was undertaken to determine if activities such as hunting, butchering, vegetal processing or lithic reduction were the primary tasks engaged in at the sites, or if a gamut of activities are represented, indicative of habitation use rather than limited activities. Tool associations between artifact concentrations and vertical levels were examined to determine if different activities were represented at the different locations. Significant differences in the artifact assemblages between components indicate different activity areas of the same occupation, or distinct occupations, possibly by peoples representing distinct cultural traditions.

Determining site function includes a discussion of the biotic and abiotic resources presently found near the sites and those recovered in archaeological contexts. This provided insight into the types of resources sought in the site territories, and how the sites functioned to fulfill certain economic needs of the inhabitants.

Paleoenvironment

Pollen, macrofloral and faunal materials were analyzed in an attempt to discern past climatic trends. This study is somewhat limited, however, by the dearth of chronometrically dated cultural strata; thirty-five pollen samples were submitted to Linda Scott of Palynological Analysts of Montrose, Colorado, for analysis. Scott's report is included as Appendix A of this report. Macrofloral materials were studied by Lorraine Dobra, also of Palynological Analysts. Vertebrate faunal analysis was conducted by Steven Emslie of the Center for Western Studies, Flagstaff, Arizona.

Subsistence

Data resultant from macrofloral, faunal, pollen and prepared tool analysis were utilized in attempts to reconstruct the subsistence strategies employed at each of the sites. At site LA 25322, the probable Navajo site, subsistence research focused upon detecting the relative importance of hunting and gathering of wild foodstuffs, horticulture, and animal husbandry, the mixed subsistence strategy proposed by Schaafsma (1979) for the Cerrito Site. While the Hispanic site 25466 yielded primarily cultigens such as corn, orchard fruits and domestic animals in terms of subsistence data, it was hypothesized that hunting of wild game and perhaps collection of wild plant foods may also have played a role at the site. Attempts were also made to discern subsistence practices at lithic scatters 25454 and 25469. Subsistence data is rather limited, however, at these non-structural sites.

Inter-site and Regional Relationships

The nature of information exchange and other social relationships between sites in the local area and more distant settlements were partially illuminated by studying the presence and frequency of exotic artifacts or materials. Exotic items included distinctive lithic materials such as obsidian and ceramics. Obsidian artifacts are particularly amenable for this study, in that the geologic source of the materials may be determined via specialized tests. Thirty-five obsidian artifacts were submitted to Fred W. Nelson of Archaeological and Geological Analyses, in Provo, Utah, for x-ray flourescence analysis. This analysis determines the chemical constituents of the obsidian artifacts, which were compared to specimens obtained at the geologic source. Ceramics were also considered. Pottery types are well defined and described in the regional literature, facilitating the study of routes of travel or trade.

Mechanical Effects of Episodic Inundation

Portions of the two lithic scatters, LA 25454 and LA 25469, have been previously inundated by exceptionally high reservoir levels. This juxtaposition of disturbed and "pristine" artifactual assemblages offered the opportunity to examine the effects of wave action and inundation upon surficial artifact scatters. It was expected that the effects would partially be a function of the size of the artifacts; heavier artifacts, such as large flakes and tools, probably would not be transported as far as small artifacts. The lighter artifacts were expected to be either missing

transported completely off the site) or redeposited in concentrations. Field techniques were selected to study these hypotheses.

Laboratory Methods

All artifacts photographs, maps, and written documentation collected or manufactured during the execution of this project are the property of the U.S. Government, and will be curated by state or federal institutions. The collected artifacts have been washed, and labeled consistently with field designations. Site number and field specimen numbers have been affixed to all artifacts of sufficient size, excepting artifacts collected during surface analysis. Surface artifacts are marked with a site number and an artifact number, which can be referenced to appropriate angles and distances recorded in Appendix B, the Catalog of Artifacts. All artifacts will be curated at the Laboratory of Anthropology in Santa Fe. Maps, photographs and written documentation have been submitted to the U.S. Army Corps of Engineers, Albuquerque District, for filing. These items include a photo-based orthographic map of LA 25322 on which the location of structures have been mapped, photographic logs and contact prints, fieldnotes, and typed and untyped excavation records with associated soil profiles. Also included are copies of fieldnotes and other records compiled at LA 25322 and LA 25466 by the School of American Research.

CHAPTER III

Site LA 25322

General

Site LA 25322 is a large and impressive site, consisting of approximately 30 masonry structures, a scatter of lithics, and to a lesser extent, ceramic artifacts. The site measures approximately 500 m by 300 m, and is situated on a south-facing slope overlooking the Rio Chama and Abiquiu Reservoir and on both sides of an unnamed tributary of the Rio Chama. As is shown in Figure 2, this tributary drainage is generally oriented north to south. Iron Spring is located approximately one-half mile (0.9 km) to the northeast, and Los Lomas de los Marios are located southwards across the river. The immediate vicinity of the site is generally devoid of trees; although scattered juniper are present, and grasses and brush dominate the landscape.

Erosion has caused linear bands of sandstone to occur as outcrops along the slopes on which the site is located, producing a series of very small benches along the slopes' vertical extent (Fig. 3). Masonry structures are clustered along these benches, often abutting against the face of the outcrops. These structures are generally circular in form, although rectangular and linear arrangements are also present. Functions are thought to vary somewhat according to form; the circular structures are generally purported to be "hogans" or habitations, and the linear and rectangular structures are thought to represent corrals. Lambing pens are also identified; these are highly variable in form. The structures are made from unmodified sandstone boulders. No mortar is presently visible, although it may have once existed. Walls generally are collapsed, and seldom exceed one meter in height.

Site 25322 is outwardly similar to the Cerrito Site, a structural site near Abiquiu Reservoir which was argued to represent an early Piedra Lumbre Phase Navajo occupation (Schaafsma 1979). Since the Piedra Lumbre Phase has been recently defined, and primarily represents data from a single site, site 25322 has been considered a valuable research resource. A considerable amount of research has consequently been conducted at the site, prior to the investigations herein reported. The site was recorded in 1974 by the School of American Research, and described in subsequent survey reports (Schaafsma 1974; 1975; 1976). A high quality plan view was prepared with alidade and plane table. Subsurface investigations commenced in 1979 by the School of American Research. Field notes compiled during the 1979 investigations indicate that of 22 definite and possible hogan structures, 17 were tested. One of 11 lambing pens or corrals was tested; a single structure of unknown function was not excavated. The results of these investigations are detailed in Table 1, and a catalog of the recovered artifacts and ecofacts is included as Appendix C. These tests were aimed primarily at locating structural features such as hearths. They frequently consisted of several small test pits, perhaps measuring 20 cm on a side. The size and form of these units were variable, however. Total area excavated seldom exceeded one square meter. They were sufficient, however, to

Figure 2. Plan view of LA25322, showing distribution of recorded features in relation to certain topographic features.

Figure 3. Photo of LA25322, showing the site's topography and vegetation.

TABLE 1

SUMMARY OF PREVIOUS INVESTIGATIONS AT LA 25322

Feature	Dimensions	Inferred Function	Area Excavated (m^2)	Depth (cm)	Chrono-metric dates	Findings and Comments
A	3.5m x 2.5m	lambing pen	0	0	-	1979 notes indicate that it might not be cultural
B	5.0m x 3.0m	hogan	1.25m^2	2.5 cm	A.D. 1940 1720 1680	Charcoal, bone and ceramics recovered. The two later radiocarbon dates are doubted by Beal (1980)
C	3.0m x 2.0m	hogan	0.2m^2	?	-	
D	3.0m x 3.0m	hogan	1.0m^2	9 cm	modern	Floor #1: 4.5 cm below ground surface, a "sandy, packed surface with carbon Floor #2: 8.5 cm below ground surface, with hearth along wall
E	2.5m x 2.5m	lambing pen	0	0	-	Not excavated
F	3.0m x 2.5m	possible hogan	0	0	-	Designated in 1975, and determined to be natural in 1979. Feature F designation given to another structure in 1979, described below
F	4.0m x 4.0m	lambing pen	0	0	-	Masonry in rockshelter. "No cultural debris associated."
G	4.0m x 4.0m	possible corral	0	0	-	"Very ephemeral"
H	3.0m x 2.5m	hogan	0.7m^2	?	A.D. 1610	Hearth found along wall, associated with an uneven floor. Charcoal recovered
I	3.0m x 3.0m	hogan	0.6m^2	15 cm	-	Excavations had "negative results."
J	2.5m x 2.5m	hogan	0	0	-	Associated masonry wall

TABLE 1
(Cont'd)

Feature	Dimensions	Inferred Function	Area Excavated (m^2)	Depth (cm)	Chrono-metric dates	Findings and Comments
K	2.5m x 4.0m	lambing pen and corral	$0.3m^2$	5 cm	-	Lambing pen situated within larger corral. Tests revealed sandy, sterile soil fill
L	2.5m x 2.0m	hogan	$0.4m^2$	7 cm	A.D. 1700	Only one of five test pits had cultural fill, to 7cm deep. Yielded pottery, ash and charcoal.
M	3.2m x 2.0m	hogan	$0.7m^2$	10 cm	A.D. 1780	Surface hearth along one wall. Radiocarbon date doubted by Beal (1980)
N	3.0m x 3.5m	hogan	?	?	-	"Tested at center - floor eroded down to gravel."
O	3.5m x 3.5m	hogan or pen	$0.06m^2$	9 cm	-	Sandy soil, no ash. Soil floor packed hard
P	6.5m x 4.0m	corral	0	0	-	Floor has eroded - much exposed rock
Q	3.5m x 3.5m	hogan	$0.04m^2$	7 cm	-	"Very shallow, rock at 7.0 cm"
R	3.5m x 2.5m	hogan	$0.27m^2$	4 cm	-	Shallow fill with some charcoal
S	3.5m x 2.5m	hogan	$0.75m^2$	25 cm	A.D. 1900 1740	Hearth found along wall. Radiocarbon dates doubted by Beal (1980)
T	2.0m x 1.0m	possible lambing pen	0	0	-	"Very tenuous" (1975)
U	2.5m x 3.5m	hogan	$0.1m^2$	10 cm	A.D. 1880	Hearth along one wall
V	2.5m x 2.5m	hogan and pen	$0.3m^2$	9 cm	A.D. 1890	Hearth found along one wall. Pen adjacent to hogan
W	3m	possible corral	0	0	-	Isolated wall
X	3.0m x 2.0m	unknown	0	0	-	"Possible rock circle."

TABLE 1
(Cont'd)

Feature	Dimensions	Inferred Function	Area Excavated (m^2)	Depth (cm)	Chrono-metric dates	Findinds and Comments
Y	4.0m x 3.5m	possible corral	0	0	-	"Suspicious semi-circle 'with' no debris."
Z	3.5m x 2.5m 2.0m x 2.0m	two hogans	$0.6m^2$	8 cm	A.D. 1400 1845vv 1850vv	One hogan tested. Hearth found along one wall. Considered multi-component on the basis of radiocarbon and tree-ring dates
AA	6m	possible hogan	0	0	-	Isolated wall
BB	1.75m x 2.7m	hogan	0	0	-	
CC	2.3m x 1.1m	possible hogan	$0.38m^2$	5 cm	A.D. 1360	Hearth encountered near masonry. Radiocarbon date considered aberrant
DD	-	lambing pen	0	0	-	
EE	3.5m x 2.6m	possible hogan	?	?	-	"Tests negative."
FF	2.9m x 3.3m	hogan	0	0	-	Evidence of door and fire in eastern portion

discern the depth and nature of cultural deposits, and to produce chronometric dates for ten structures. Internal features were infrequently discovered, and consisted primarily of hearths located adjacent to the masonry walls in habitation structures. Floor surfaces are reported in some habitation structures, but some are undulating and all appear to be poorly prepared and infrequently utilized. Corrals and lambing pens lack interior features. Cultural fill consists of sandy soil, sometimes with charcoal flecks, bone fragments, and artifacts. Depth of cultural deposits was generally under 10 cm, and never exceeded 25 cm.

Beal (1980) reports that the Ghost Ranch Archaeological Field School conducted investigations at LA 25322 in the late 1970s or early 1980s, but this is discounted by Mrs. Dart Shibley, director of the Anthropology Museum at the Ghost Ranch (Dart Shibley, personal communication).

Field Methods

The recent elevation of the reservoir level resulted in Features G, F, and possibly D being inundated. The boulder scatter originally identified as Feature E near Structure D was also subject to impact, but had been previously determined to be a natural, non-cultural entity. The scope-of-work listed the tasks to be implemented at LA 25322; these are presented below:

1) Prepare or modify existing site maps which depict Features D, F, and G, the artifacts scatters associated with these features, and the general site topography;

2) Conduct controlled surface collections and subsurface tests in the vicinity of Features D, F and G;

3) Conduct controlled excavations at Features D, F and G;

4) Plot site boundaries and all site features on a photobased orthographic map; and

5) Prepare mitigation estimates and recommendations for the non-inundated portion of the site. This is the only site of the four discussed herein for which management recommendations are necessary.

The data recovery techniques employed to achieve these ends are discussed in this section.

Features F, G, and D are located on a south facing slope overlooking the Rio Chama. Features F and G are located along the same bench, not far from the 1982 level of the Abiquiu Reservoir, and Feature D is located several tens of meters eastward on a slightly higher bench Fig. 4). Feature F consists of a semi-circular stone enclosure situated beneath a natural overhang (Fig. 5). The area enclosed by the structures is quite small, measuring only 0.7 square meters. Soil in the feature is shallow, sandy, and probably the result of erosion of the sandstone outcrop. Surface artifacts are very sparse in the vicinity of Feature

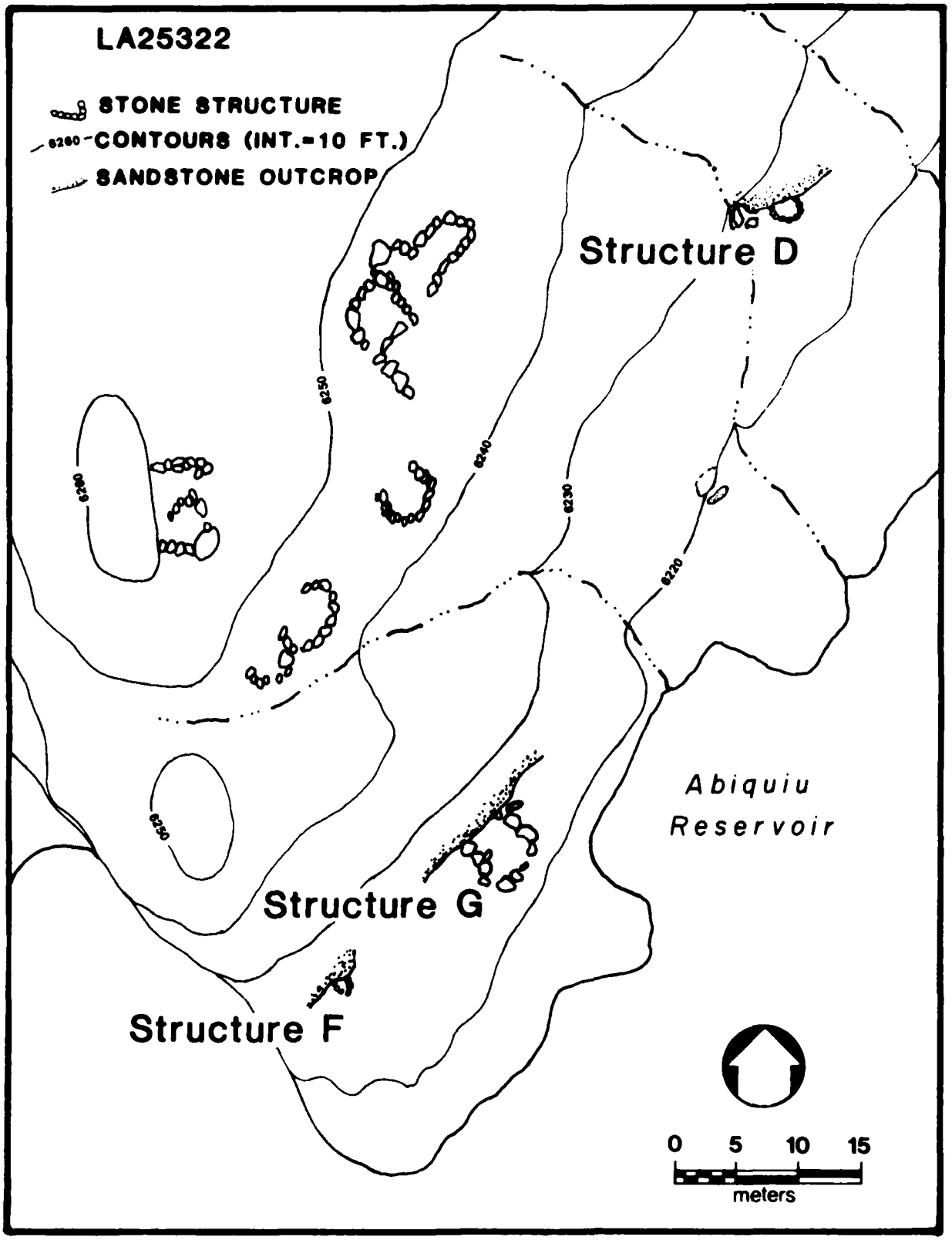

Figure 4. Map showing the location of Features D, F, and G.

Figure 5. Photo of Feature F, prior to excavation.

F due to past episodic inundation and its probable limited use. School of American Research field notes suggest that the feature functioned as a lambing pen.

Feature G, described as a "very ephemeral" stone structure, was thought to be a possible corral by earlier investigators. Present are boulders scattered on a small bench at the base of a talus slope, that may be construed as having been aligned by humans. Here too, surface artifacts are quite scarce.

Feature D is the remains of a semi-circular wall abutted against a sandstone ledge (Fig. 6). It measures approximately 2.5 m in diameter. The School of American Research excavated approximately $1m^2$ in the eastern portion of the structure, and found floor levels at 4.5 cm and 8.5 cm below the present ground surface. A hearth was found along the wall at the level of the lower floor, which produced a radiocarbon sample yielding a modern date. Beal (1980) believes that the modern date resulted from rootlet contamination. Surface artifacts are present in the vicinity of Feature D, the area having not been previously inundated.

Data recovery began by collecting all surface artifacts in the vicinity of the three features. Considering the topographic situation and the proximity of other structural features upslope, it was decided to confine collection activities within approximately a ten meter radius of each structure. This ideally resulted in the collection of artifacts associated with the occupation or use of the three key features, and avoided affecting artifacts associated with the other structures. The artifacts in the defined area were pin-flagged, mapped with the aid of a compass and tape measure in reference to a centrally located rebar datum, and were collected in a manner preserving their provenience information.

Subsurface testing was then initiated outside of the features, in order to detect significant buried cultural strata, buried artifacts and extramural features. Previous episodic inundation had removed the soil in the vicinity of Features F and G, so extramural excavations primarily focused upon Feature D. Twelve extramural test squares, each measuring 1 m by 1 m, were excavated; eight were nonramdomly located near Feature D, two were located in Feature G, and two were situated in a small rockshelter between Features D and G (Figs. 7 and 8). No structures were visible in the small rockshelter (Fig. 9), but oxidized sandstone fallrock and charcoal flecks in the soil indicated that an occupation level might be present. Feature G was tested with two one meter square test units rather than being entirely excavated, as surficial indications suggested that the feature was of non-cultural origin. As will be discussed in a subsequent section, these test squares tended to confirm the observation that Feature G was non-cultural. The test squares were excavated in 10 cm vertical increments, and all excavated fill was passed through 1/4 inch mesh and inspected for artifacts and ecofacts.

The interiors of Features F and D were then entirely excavated. Feature D was divided into two one meter squares; these covered most of the structure's interior area, leaving only small areas, resultant from the curved wall, to be excavated separately. The two centiare (one square meter units) were excavated independently. The eastern square

Figure 6. Photograph of Feature D.

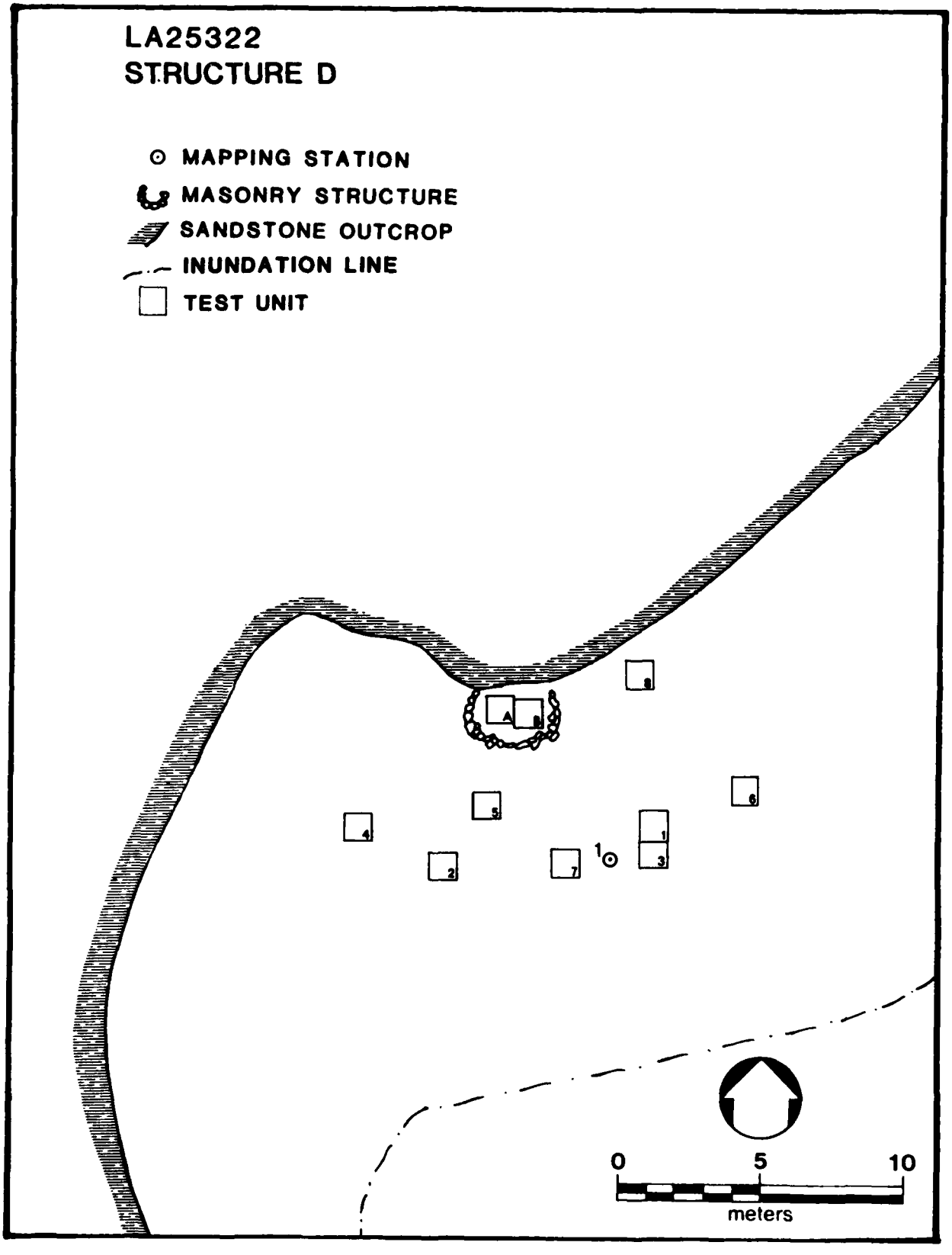

Figure 7. Distribution of excavation units near Feature D.

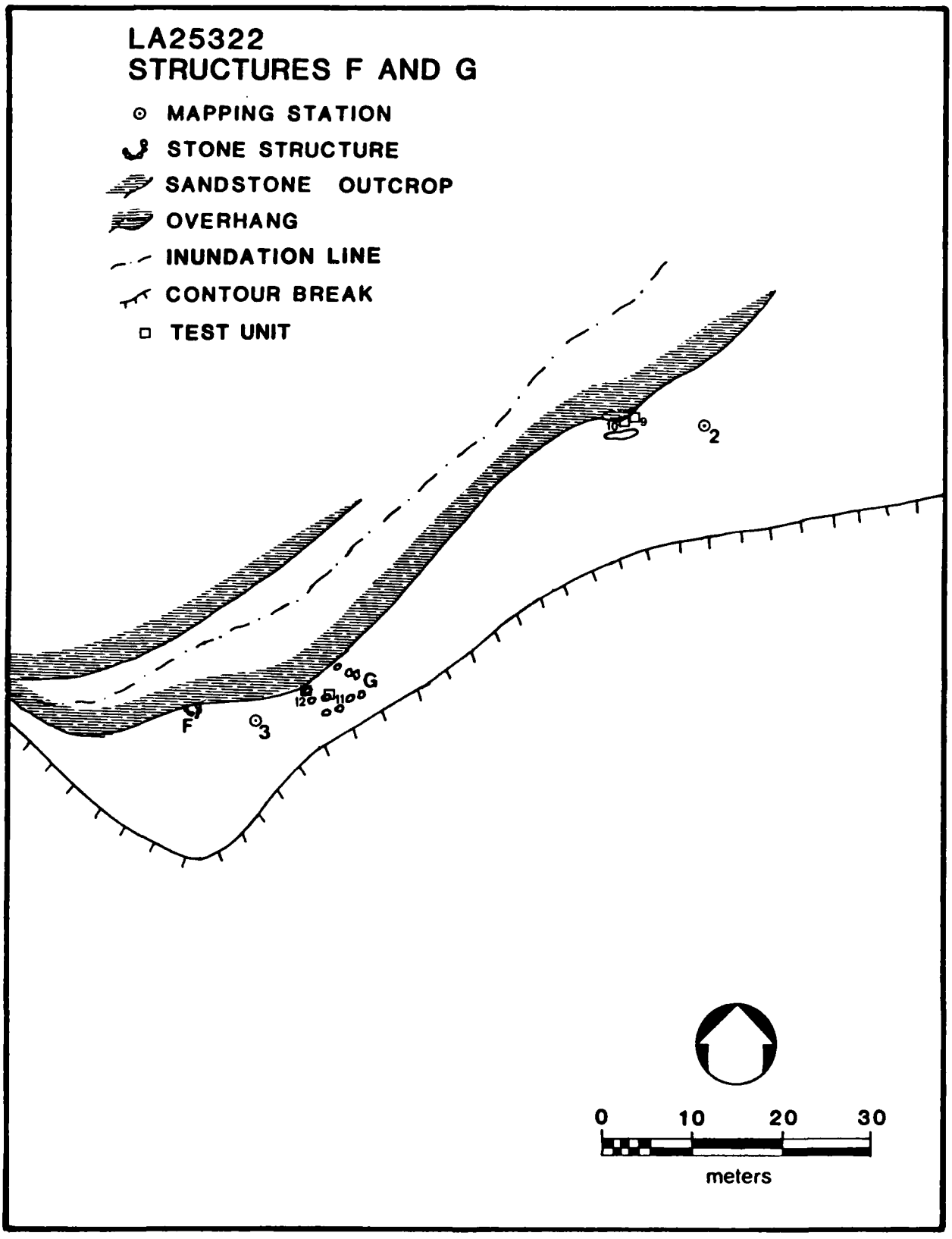

Figure 8. Distribution of excavation units in rockshelter and Feature G.

Figure 9. View of small rockshelter investigated at LA25322.

(Square 1) was excavated first. It was mostly filled with backdirt resultant from earlier excavation in the structure by the School of American Research (Beal 1980). The limits of the earlier work was defined by black plastic sheeting. The adjacent, undisturbed square (Square 2) was then excavated, followed by the remaining fill around the interior wall.

Feature F was excavated in a single unit, due to its small size. Excavations proceeded in 10 cm arbitrary levels. Soil profiles were carefully observed to detect occupation levels. All fill was screened through 1/4 inch mesh.

Cultural Features and Stratigraphy

Feature D, Interior

As Figure 10 illustrates, Feature D is a semi-circle of sandstone rock wall situated adjacent to a sandstone outcrop. At the time of excavation, the wall stood a maximum of approximately 70 cm high, with a maximum of five courses. The interior of the structure measured 1.9 m across its widest point, and 1.5 m from the sandstone outcrop to the front portion of the wall. No evidence of a doorway was visible.

That portion of Feature D previously excavated was first exposed, to provide a soil profile to aid in further excavations. The soil in this disturbed area of course lacked integrity, but the hearth evidently encountered by the School of American Research investigators was found. It was situated in the south-east portion of the structures, and was evidenced by a charcoal stained soil and two horizontal sandstone slabs. Since the feature had been previously excavated, the precise design of the feature cannot be determined. The undisturbed western portion of Feature D was excavated to a depth of 35 cm below the present ground surface. The upper 10 cm consists of a very sandy, loose soil, light brown in color (7.5 YR 5/4). A single bone fragment but no artifacts were recovered in this level. The next 20 cm also consisted of a sandy soil, which was somewhat darker (5 YR 4/4 to 5 YR 5/4) due to the presence of charcoal flecks. The lowest level, from 30 to 35 cm below ground surface, was much more clayey in texture and distinctive in color (10 R 5/2). No artifacts or charcoal was present in this lowest level, indicating that it is of non-cultural origin. Two possible living surfaces were observed during excavation, which probably correlate with the two floors discovered by previous investigators. One was located between 10 and 20 cm below the present ground surface, which is thought to be associated with the hearth in the southeast portion of the structure. The second living surface was approximately 5 cm beneath the first surface. The two possible living surfaces were evinced by subtle and discontinuous changes in soil color and not by textural changes or by artifact orientation and distribution. Soil texture remained rather unconsolidated throughout, and no artifacts, ecofacts or rubble was found on either living surface. The nature of the living surfaces strongly suggests that they were not prepared, and were only slightly utilized. This hypothesis is corroborated by the dearth of artifacts found in the structure; only two bone fragments and one Tewa Red potsherd were recovered during the excavation of Feature D.

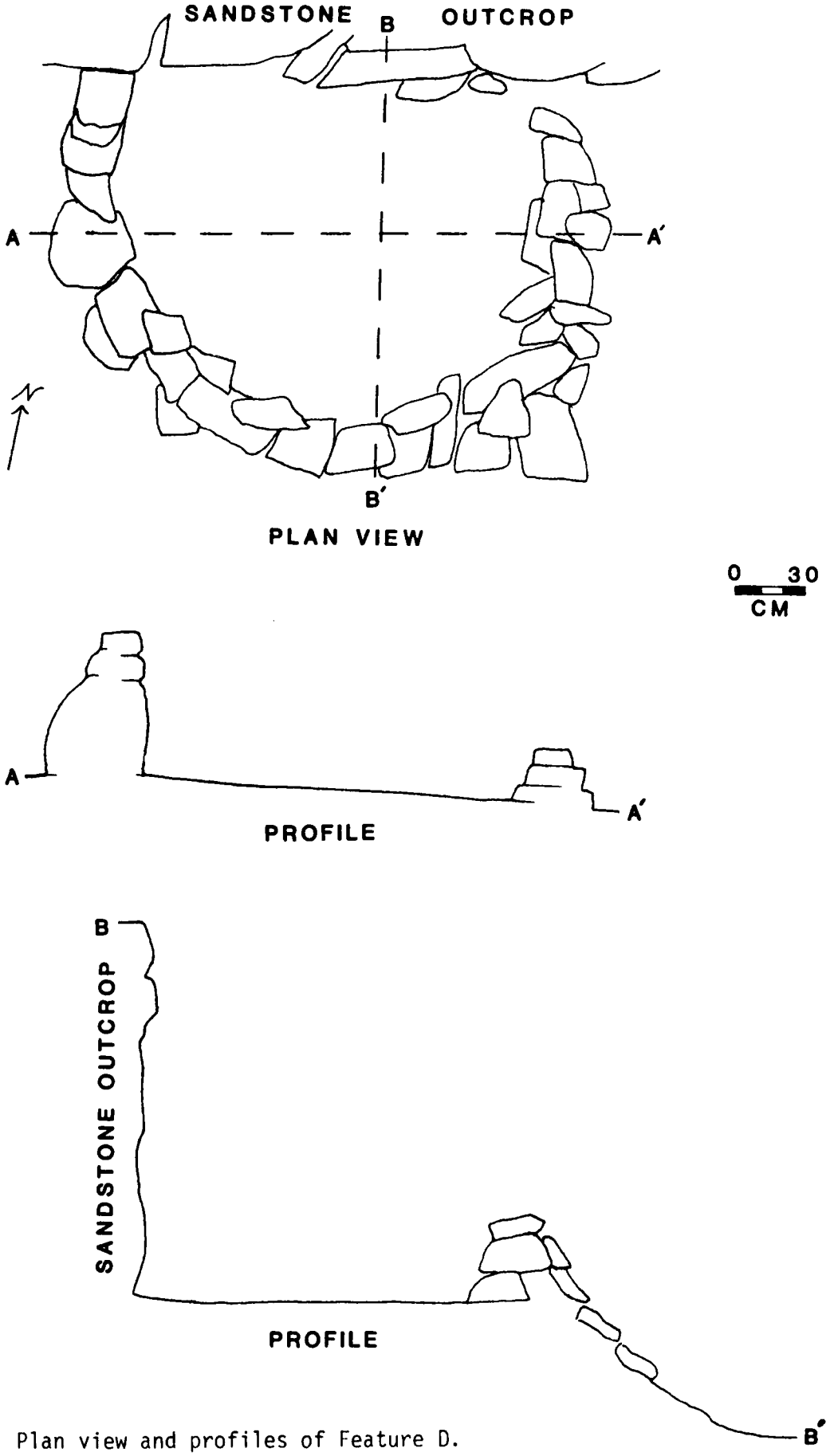

Figure 10. Plan view and profiles of Feature D.

Feature D, Extramural

Eight one meter square test units were excavated on the bench on which Feature D is located. The stratigraphy was rather consistent from one unit to the next. Seven of the test squares encountered bedrock at 20 cm or less below the present ground surface, and the remaining test square (T.U. 6) encountered bedrock at 40 cm deep. The upper portions consisted of a sandy soil, brown in color (10 YR 4/5). This overlaid a more clayey soil (color: 5 YR 6/4), which was situated above sandstone bedrock. Artifacts were rather sparse, and were generally confined to the uppermost 10 cm. Charcoal flecks were occasionally present.

Feature F, Interior

Feature F is a small structure, situated under a sandstone overhang. It is semi-circular in shape, and incorporates the back wall of the overhang into its structure (Fig. 11). The interior measures approximately 80 cm from the back wall to the front, and approximately 90 cm across. The entire structure is protected by the overhang. Walls are low, presently standing no more than 60 cm high, or a maximum of two courses. Little rubble is present, suggesting that the walls never stood much higher. An opening is present in the wall towards the front of the rockshelter, but it is unknown whether such functioned as a doorway.

The fill within Feature F had no archaeological value. Past episodes of high reservoir levels had inundated the feature, evidently removing cultural deposits and artifacts, and possibly damaging the wall. Present within the structure was approximately 25 cm of sandy soil, evidently the product of erosion of the rockshelter. No charcoal or artifacts were discovered. Sandstone bedrock was situated beneath the sandy soil.

Feature G consists of a somewhat semi-circular arrangement of 11 boulders, spaced on an average of 0.5 m apart. No surface artifacts are present, and much of the soil has apparently been eroded by previous inundations, leaving exposed sandstone bedrock, quartzite cobbles, and some soil. Perhaps due to the effects of past inundation, the arrangement of boulders now appears as if it is the product of natural, rather than human agents. Two one meter test squares were excavated within Feature G. Both were excavated to either bedrock or a level clearly below any possible occupation level, at a depth of 25 and 30 cm. Soils were very rocky. No charcoal, artifacts, or other indications of human use were encountered.

Other Excavation Units

Test Units 9 and 10 were situated beneath a small rockshelter, located on the same bench as Features F and G. The excavation units are adjacent, and resulted in the inspection of approximately 75 percent of the area protected by the rockshelter. The two units were excavated to 40 cm and 30 cm respectively, below present ground surface. The upper 20 cm consisted of a sandy, light brown soil with scattered animal dung, gravel and sandstone spalls. Between 20 and 40 cm below the present ground surface, the soil is somewhat more clayey, and contains charcoal

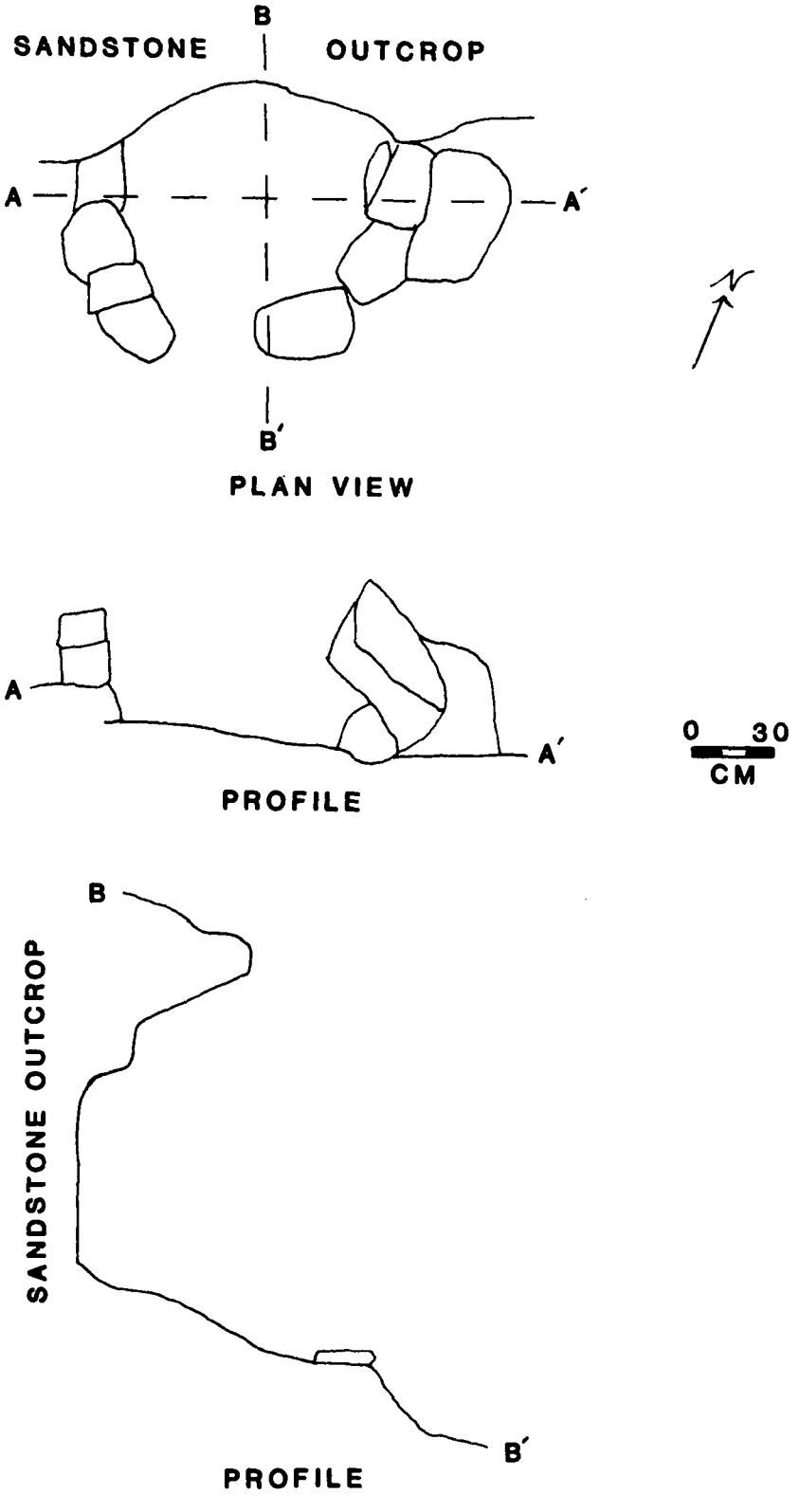

Figure 11. Plan view and profiles of Feature F.

flecks and fallrock. Bedrock was encountered at some locations. Artifacts were present down to 20 to 30 cm below the present ground surface, and scattered charcoal flecks were noted down to bedrock. Artifacts were, however, rather sparse, totalling only six in the two excavation units.

Excavation in the rockshelter indicated human use. The lack of features, definable living surfaces and the paucity of artifacts suggests, however, that occupation was ephemeral.

Dating

While charcoal was observed in many of the excavation units, it was generally present in quantities insufficient for dating purposes. Three samples were collected, however, and one was processed. Of the two unprocessed samples, one was thought to represent contents of the hearth in Feature D excavated by the School of American Research. The hearth had previously yielded a modern date, possibly a result of contamination (Beal 1980). The second unprocessed sample was believed to contain too little charcoal. The processed sample, Beta-6601 (C14 #2) yielded a radiocarbon date of 23,040 ± 540 B.P. This date obviously does not represent the occupation of the site, being far too early. Beta Analytic, Inc. personnel double checked their procedures and calculations, and found no anomalies, so the reason for the date is unknown. It seems most likely that organic matter of non-cultural origin was inadvertently included in the sample.

Two obsidian artifacts were submitted for obsidian hydration analysis in order to further our understanding of the site's chronology. The technique is based upon the assumption that obsidian, a natural glass, absorbs water at a predictable rate. A newly exposed obsidian surface, perhaps produced by a flintknapper, absorbs atmospheric water and thereby produces a cortex or rind. The thicker the rind, the longer the surface has been exposed. When certain variables are known, both relative and chronometric dates can be determined by measurement of the hydration rind.

The speed at which obsidian absorbs water is dependent upon certain chemical and environmental variables. These variables tend to be quite localized geographically, making determinations of age difficult, unless the variables are carefully identified and the proper adjustments in calculations are made.

While all obsidians are primarily aluminum and silicon, the constituent elements may vary between obsidian sources. The chemicals comprising various obsidians have an important impact upon the hydration rate. To facilitate the comparison of hydration measurements, it is therefore necessary to identify the chemical types of obsidian under study, and so ascribe the proper hydration rate for that material. For this project, this was done by measuring the Refractive Index on powdered samples by the central focal masking technique. The refractive index tests indicated that both specimens collected at site 25322 were chemically quite similar.

Temperature is another critical variable affecting hydration rates. In general, higher temperatures seem to increase the rate of water absorption (Burns 1981). The primary problem with temperature as a variable, however, is discerning temperature fluctuations affecting the obsidian specimen. While a specimen buried at 10 m below the ground surface may hydrate at a slow and constant rate, specimens buried less than 10 m but more than 0.5 m are subject to seasonal fluctuations in temperature, resulting in faster water absorption (Burns 1981:34). Obsidian buried less than 0.5 m are affected by both seasonal and daily temperature fluctuations, further affecting the rate of hydration. Surficial specimens are subject to direct sunlight, perhaps with alternating shade, making the rate of water absorption almost impossible to calculate (Burns 1981). The processed samples were analyzed assuming an effective hydration temperature of 12.6° C.

Cognizant of the inherent difficulties in obsidian hydration analysis, the Abiquiu Reservoir project samples were sent to Mr. Fred W. Trembour of the Branch of Isotope Geology, U.S. Geological Survey, in Denver, for study. As Table 2 illustrates, the specimens from site 25322 apparently date to 5100 B.P. and 5800 B.P. or approximately 3150 B.C. and 3850 B.C. respectively. These dates are much earlier than expected, and probably represent accelerated hydration as a consequence of rapid temperature fluctuations resulting from shallow burial.

From obsidian data generated at the Cerrito site, another structural Navajo site near Abiquiu Reservoir, Schaafsma (1979) produced a formula for the common Polvadera Peak obsidian in which one micron of hydration was equal to 119 years. While variables such as temperature fluctuations are not discussed, the formula does yield dates more in line with the artifactual and architectural site attributes. Using Schaafsma's formula, the two specimens from site 25322 yield dates of approximately A.D. 1284 and A.D. 1238.

TABLE 2

RESULTS OF OBSIDIAN HYDRATION ANALYSIS
SITE 25322

F.S. No.	Provenience	Refractive Index	Hydration $(mm)^2$	Hydration Rate at 12.6° $(mm)^2/10^3$ yrs.	Hydration Age, Years B.P.
17	Test Unit 7, Level 1	1.483	38.7	6.7	5800
19	Surface Artifact 10	1.483	34.0	6.7	5100

Since the credibility of the obtained chronometric dates is questionable, dating of the investigated features must rely on cross-dating diagnostic artifacts. Only three such artifacts were discovered - all badly weathered potsherds. One Tewa Red-on-buff sherd was found within the fill of Feature D and one Tewa Black-on-white and one Tewa Red-on-buff was found on the surface in the vicinity of Feature D. Carlson (1965) writes that while the exact temporal span of the two ceramic types represented is uncertain, Tewa Black-on-white and Tewa Red-on-buff were certainly manufactured by A.D. 1750 and on into the twentieth century. Warren (1979) indicates that Posuge Red, which is Tewa Red-on-buff, may have appeared by A.D. 1675. Beal (1980:70) implies that Tewa Red-on-buff may have appeared as early as A.D. 1650. Ceramics indicate, then, the presence of components dating between the mid-seventeenth century and the early twentieth century.

Material Culture

A total of 89 artifacts was recovered during the investigation of site 25322. This includes 81 chipped stone artifacts and six potsherds. Fifty-seven lithic artifacts and five sherds were found on the surface near the three investigated structures; the distribution of these artifacts is shown in Figures 12 and 13. The remainder of the artifacts were found in buried contexts.

The lithic artifacts consisted primarily of debitage. Four cores and five prepared tools, including two bifaces, one chopper, one scraper, and one projectile point base, were found. Measurements of the prepared chipped stone tools are presented in Appendix D.

Projectile Points

A single projectile point (F.S. 18 #75) was recovered at site 25322 (Fig. 14a). The artifact was found on the surface, approximately 48 m from Feature J, during limited mapping tasks on that portion of the site unaffected by lake level fluctuations. The artifact is fragmentary; the tip and one tang are missing. The blade appears to have been triangular in shape. The base is straight. The artifact is made of white chert, very likely of local origin. Large corner-notched projectile points are reported by Irwin-Williams (1973) to be of relatively late manufacture in northwestern New Mexico, post-dating approximately 1000 B.C. Similar projectile points have a very long temporal span in other portions of the Colorado Plateau, however, spanning Archaic Stage and Formative Stage cultures. An apparently similar projectile point was found during investigations of site 25322 by the School of American Research; field notes mention the discovery of a large corner-notched point near Features D and G, which was ascribed Basketmaker II affiliation. It is feasible that the artifact herein described was part of the Navajo assemblage, and was either collected by the Navajo from an earlier component or was manufactured by the Navajo.

Bifacial Knives

This category includes tools that have been flaked on both dorsal and ventral surfaces to produce a roughly triangular-shaped implement

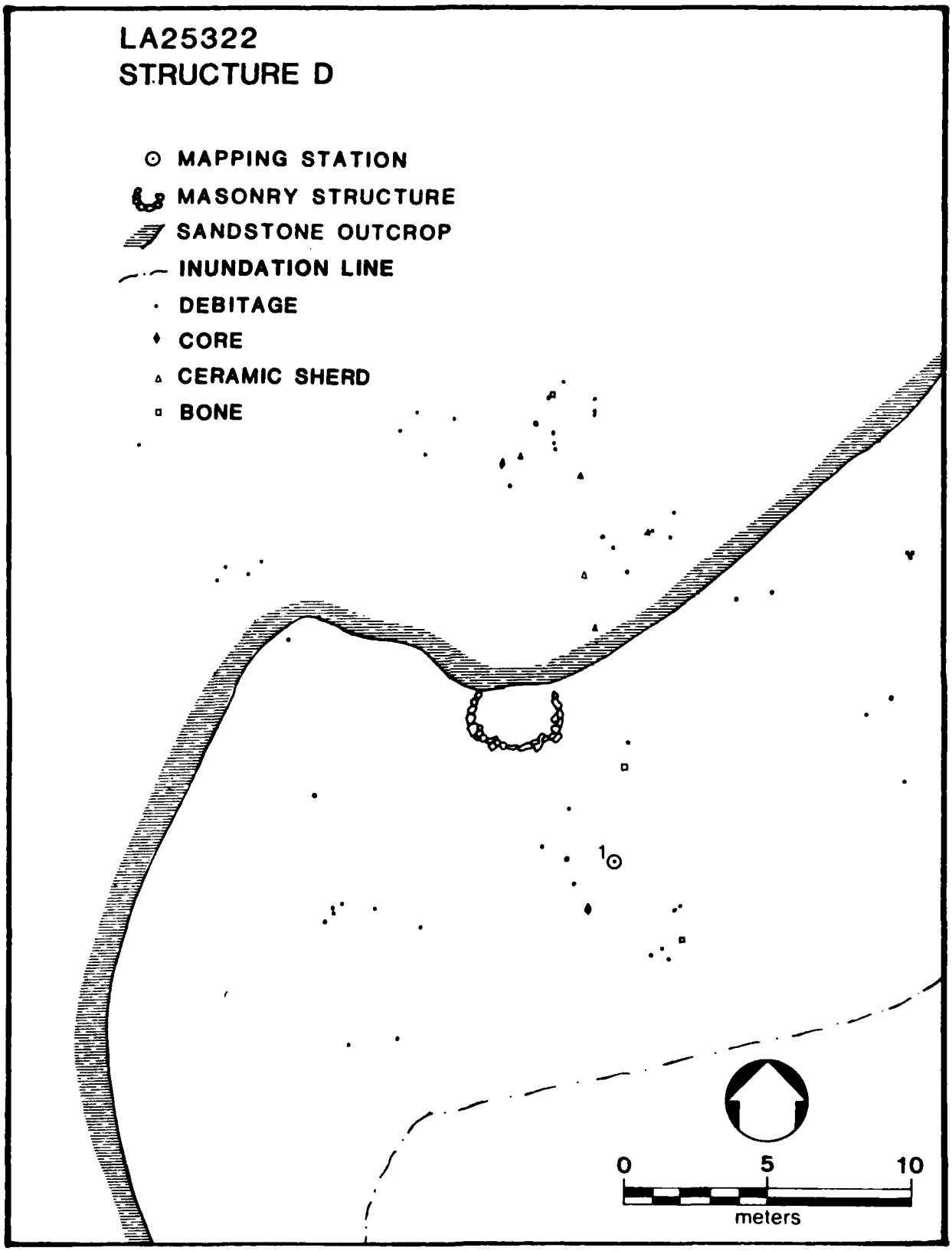

Figure 12. Distribution of surface artifacts in the vicinity of Feature D.

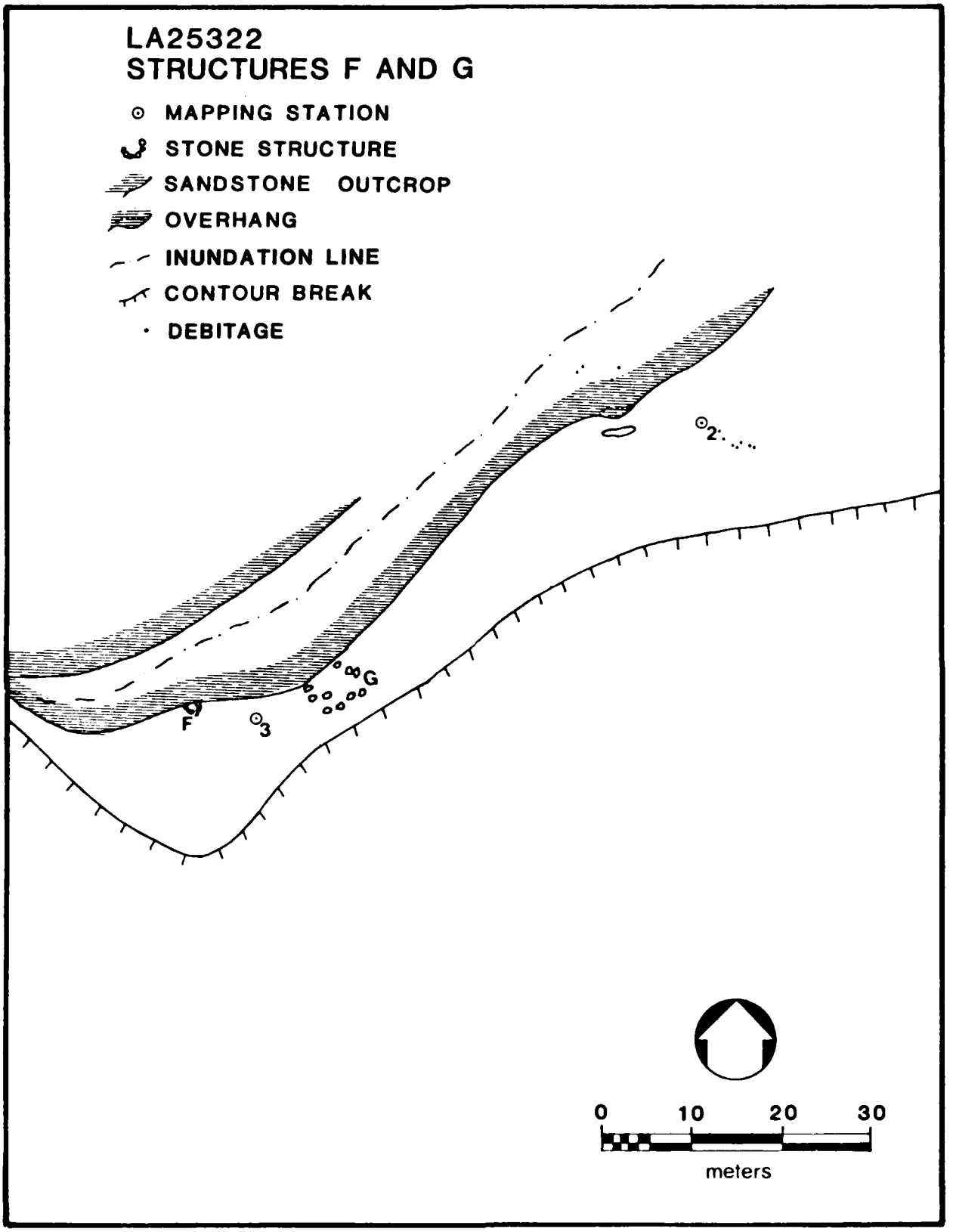

Figure 13. Distribution of surface artifacts in the vicinity of Feature G.

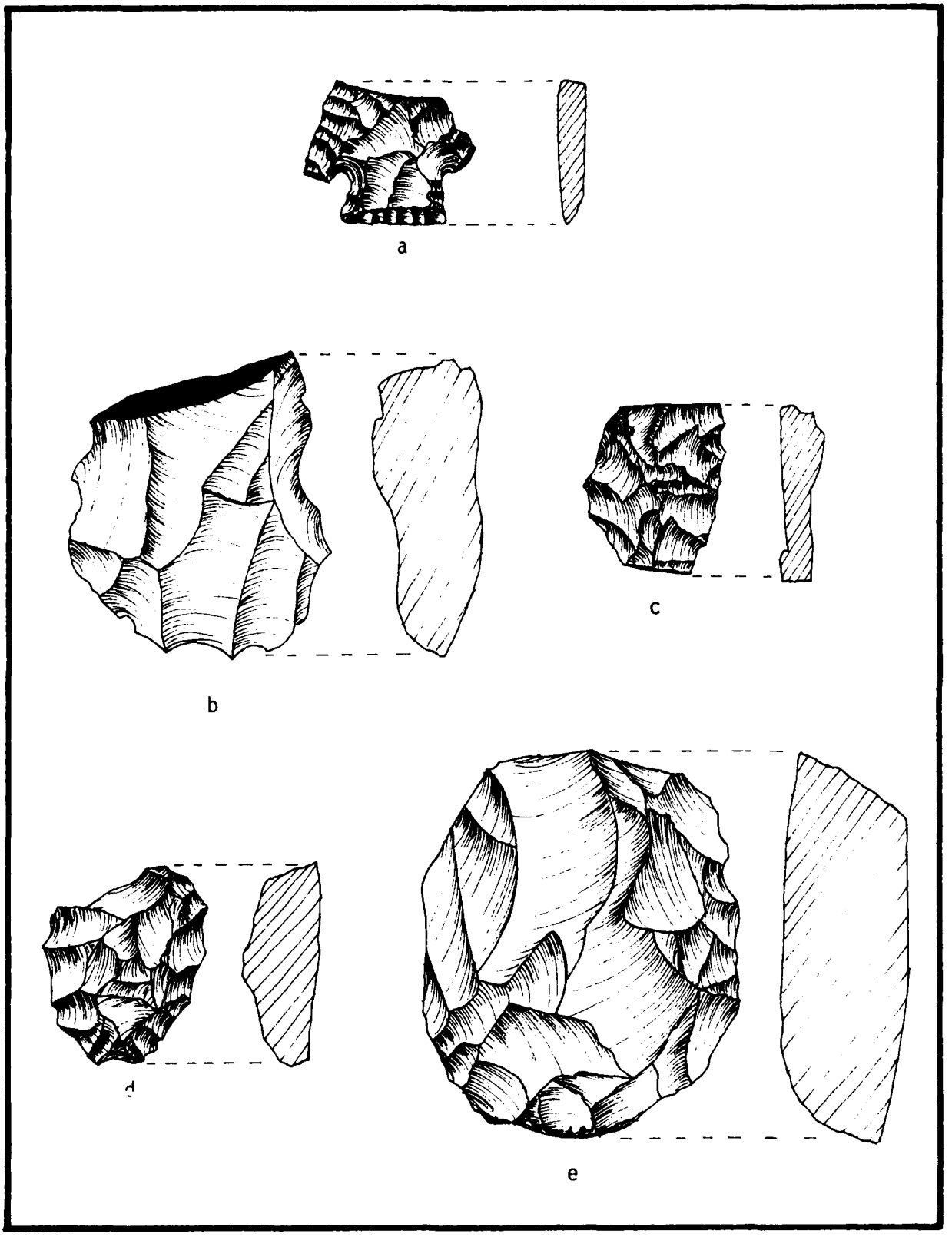

Figure 14. Prepared chipped stone tools recovered at LA25322.

suitable for general cutting purposes. Two such artifacts were recovered during recent investigations at site 25322. Both are chert, white and white and brown in color, and were probably locally made. One specimen (Fig. 12b) (F.S. 18 #58) represents a large flake that has been bifacially flaked in a manner preserving some flake attributes, while the other (Fig. 14c) has undergone more extensive reduction. The latter artifact (F.S. 18 #60) is fragmentary, representing the midsection of an artifact.

Discoidal Scraper

As Figure 14d illustrates, this artifact (F.S. 18 #39) is distinctly plano-convex in cross section. The flat (ventral) surface shows little modification, while the convex (dorsal) surface has been extensively modified to form a roughly oval artifact. The edge of the artifact is at a steep angle, and unifacial attrition and crushing along the entire periphery indicate scraping activity. The scraper is white chert, which was probably locally available.

Chopper

This artifact (Fig. 14e) (F.S. 18 #9) is rather massive and crudely flaked. It has been bifacially flaked to form a roughly oval artifact with a sinuous edge. Wear patterns are evident along portions of the edge. Cortex is present on the dorsal surface, and indicates that the tool was manufactured from a water-worn cobble. The artifact is made of brown and red chert, possibly of local origin.

Cores

Four chert cores were recovered during investigations at site 25322. Two show evidence that flakes were removed from a single direction, and two evince multidirectional chipping. The color of the cores suggest that they were locally collected; this is substantiated by the fact that they were not thoroughly reduced prior to discarding. The cores range from 54 mm to 96 mm in length, 38 mm to 86 mm in width, and 21 mm to 49 mm in thickness. None evince utilization.

Utilized Flakes and Debitage

This category represents the waste materials produced by flintknapping. While these artifacts may possess a set of common attributes, such as relative thinness, platforms and bulbs, they do not commonly demonstrate direct modification. Direct modification occurs only as platform preparation, a relatively rare characteristic in the Abiquiu Reservoir assemblages, or modification as an incidental result of use. Seventy-four artifacts are classified into this type. Sixty-eight of that total are unutilized, and six evidence human use. Of the utilized flakes, four have unifacial wear patterns along the margins, one has unifacial wear at its distal end, and the remaining artifact has bifacial wear along its margin. All but three of the 72 flakes are chert. The exceptions are nonutilized interior obsidian flakes. Two of the obsidian artifacts were submitted to A & G Analyses for trace element analysis. Both emanated from obsidian source A, identified as Polvadera Peak, Arriba County. Table 3 presents the results of this analysis.

TABLE 3

Results of Analysis of Chemical Composition for Sample of Obsidian Artifacts Collected from LA 25322

Sample No.	Provenience	Hydration Analysis I.D. No.	Rb ppm	Sr ppm	Y ppm	Zr ppm	Nb ppm	MnO %	Fe_2O_3 %	TiO_2 %	Ba ppm	Na_2O %	Obsidian Source
1268	FS19	N6A 1	151.2	7.5	27.8	108.6	62.1	.067	.61	.088	18.4	4.73	A
1269	FS17	N6A 2	150.2	7.7	32.2	115.5	66.0	.066	.61	.090	18.8	4.66	A

* ppm = parts per million

Most of the debitage found on site 25322 probably represents waste from locally procured raw stone. The chipped stone artifacts appear macroscopically very similar to raw stone specimens collected at sites 25454 and 25469, where quarrying activities are thought to have occurred. This is not to imply that the stone at 25322 emanated from those quarry sites, as the pedregal cherts are distributed over a broad area near Abiquiu Reservoir, in Quaternary alluvial gravels. Raw stone was very likely procured somewhere in the Piedra Lumbre Valley, however. The chert flakes found at 25322 are varied in color, as are the cherts in the local gravel terraces. Seventy percent are classified as white; nine percent are gray; brown, red, and pink each account for five percent of the total, and the remaining artifacts are black or yellow.

Various stages of lithic reduction activities are represented at site 25322. Nine flakes or 13 percent of the flakes are classified as primary flakes, indicating initial reduction of raw materials. These artifacts demonstrate typical flake characteristics, yet retain 50 percent or more cortex over the dorsal surface. Twenty-four percent or a total of 17 of the flakes are secondary, and have between one and 49 percent cortex on the dorsal surface. These flakes represent further reduction of stone. Forty-six flakes, or 64 percent of the total, retain no cortex and indicate final chipping activities. These percentages further support the hypothesis that primarily locally obtained stone material was being processed. That primary and secondary flakes together account for 37 percent of the total indicates that mainly large and slightly reduced raw stone materials were carried to the site - an energy intensive task that is efficient only if lithic sources are nearby. This compares to two sites located near timberline on the Continental Divide in Colorado, where raw lithic material was unavailable locally, and less than three percent of the flakes retained any cortex (Reed 1981). Various flake attributes of the site 25322 assemblage suggest that flintknapping techniques employed at the site were not highly efficient. Less than ten percent of the flakes evidenced platform preparation, and of the flakes whose terminus was present, 51 percent ended in either hinge fractures or step fractures.

Flakes tended to be rather large. They averaged 28.6 mm in length, 26.8 mm in width, and 8.4 mm in thickness. For comparison, debitage from the aforementioned sites on the Continental Divide in Colorado averaged between 10 mm and 15 mm in length. At site 25322, platforms averaged approximately 7.4 mm in length and 3.0 mm in width.

Ceramics

Six sherds were recovered at LA 25322, in both surface and subsurface contexts. Five sherds were found on the present ground surface, and all were badly eroded. Only two were identifiable as to type; one Tewa Red-on-buff and one Tewa Black-on-white sherd was recovered. The one buried sherd was found within Feature D, between 10 cm and 20 cm below the present ground surface. It has been classified into the Tewa Red-on-buff type.

Faunal Remains

Four animal bones were recovered during the investigation of LA 25322. All are fragmentary in nature, which hampered identification. As Table 4

below indicates, two unidentified mammal, one unidentified large mammal, and one unidentified artiodactyl bone were found. Two bones (F.S. 25 and F.S. 26) were recovered on the surface, and two (F.S. 24 and F.S. 27 were discovered in Level 2 in the western half of Feature D.

TABLE 4

Faunal remains identified at Site LA 25322

F.S. #	Taxon	Element
25#53	Mammalia	unidentified fragment
26#13	Mammalia	unidentified fragment
24	Artiodactyl	medial hyoid
27	Mammalia, large	unidentified fragment

Floral Remains

Four pollen samples, collected in a vertical column in Feature D, were processed. The species represented, discussed in Appendix A, are characteristic of pinyon/juniper woodlands or open areas near pinyon/juniper woodlands. No pollen or macrofloral remains were encountered that indicate human economic practices.

Interpretations

Chronology and Cultural Affiliation

In spite of the fact that the radiocarbon date processed in conjunction with the present investigation of LA 25322 was clearly unrepresentative of a human occupation at the site, there are other lines of data that can be used to construct a chronological framework. Obsidian hydration analysis, for example, suggests occupations at approximately 3850 and 3150 B.C. or A.D. 1284 and A.D. 1238, depending on whether Trembour's or Schaafsma's (1979) conversion rate is utilized. While these data suggest occupations of the site prior to a Navajo occupation, it seems more likely that the dates are in error due to accelerated hydration. The hydration rate may have been accelerated due to very shallow burial and concommitant rapid temperature fluctuation. It is possible, therefore, that the dated obsidian specimens may have actually been associated with later occupations.

The best indicators of site chronology may be the tree-ring and radiocarbon dates collected at the site by the School of American Research in the 1979 testing program. As illustrated in Figure 15, these dates, derived from samples obtained within structural features, range from approximately A.D. 1360 to A.D. 1950. Beal (1980) considers the earliest date, A.D. 1360, to be aberrant, and questions the date of

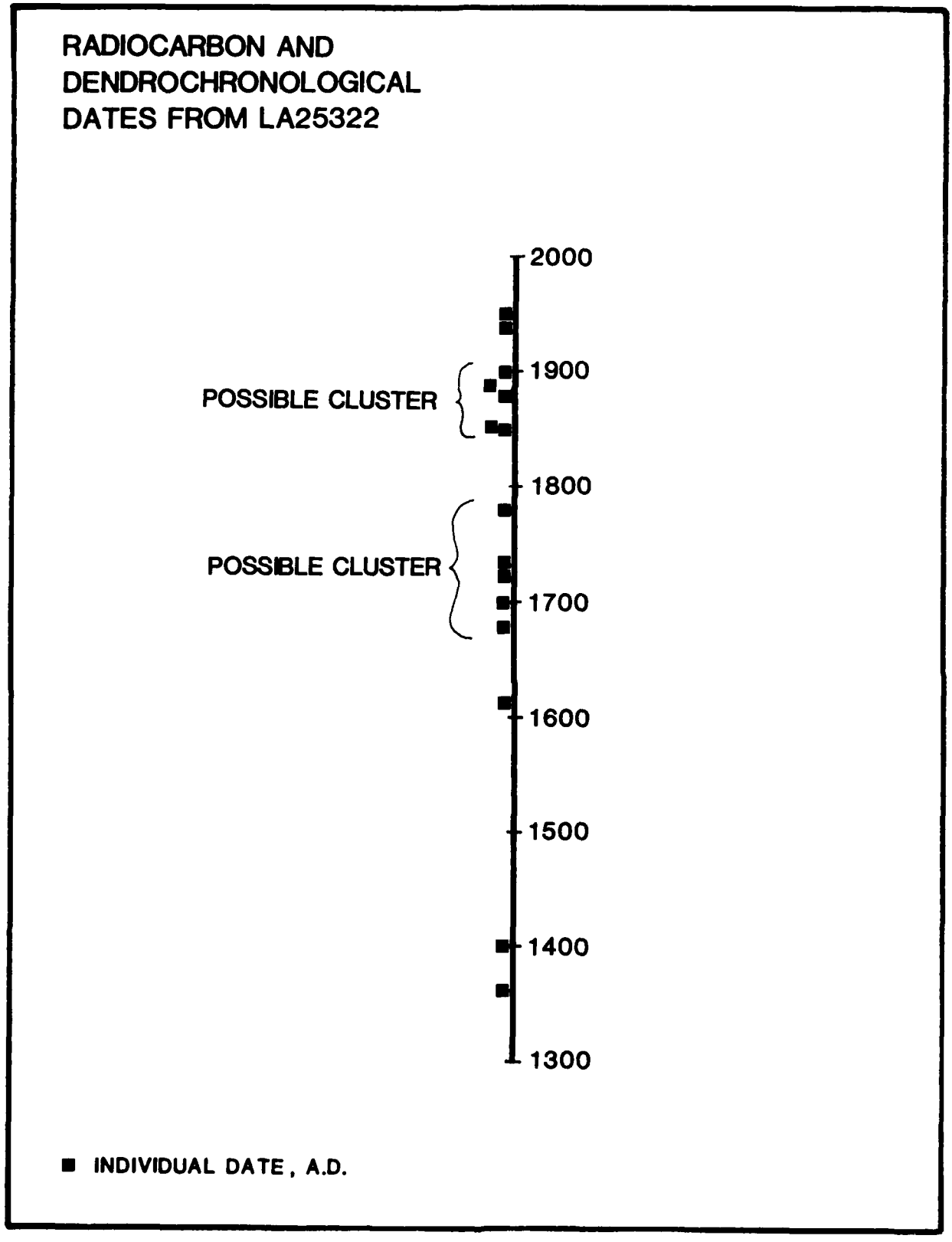

Figure 15. Distribution of radiocarbon and dendrochronological dates from LA25322.

A.D. 1400, as it implies a Puebloan occupation. He further doubts that the twentieth century dates represent aboriginal occupation, and suggests that these late dates indicate sample contamination or possibly recent recreational activities. Beal (1980) posits that the primary period of occupation at the site occurred between A.D. 1650 and 1750, but that some structures may have been constructed or reoccupied later. Inspection of the distribution of chronometric dates obtained by Beal (1980) certainly suggests long-term occupation of the site; indeed, between A.D. 1650 and 1900, there are more dates post-dating the primary Navajo occupation suggested by Beal (1980) than fall within the span.

The distribution of Beal's dates suggests two clusters, one between approximately A.D. 1680 and 1780, and another between approximately A.D. 1845 and 1900. While the dates in the earlier cluster may represent a Navajo occupation, dates in the later cluster are possibly related to short-term Ute, Tewa Pueblo, or Hispanic utilization.

Analysis of material culture provides little insight into the cultural affiliation of the various occupations. The range of occupation post-dates Spanish appearance in the region, an event that greatly increased the scope of trading networks, possibly resulting in greater variability of artifact assemblages than was previously possible. After the establishment of extensive Spanish trading networks, there may have been fewer artifact types diagnostic of a single cultural group. The artifacts recovered at site 25322 are primarily lithic or ceramic. There is apparently no record of glass or metal artifacts on the site, which may suggest that the primary occupations of the site were by aboriginal groups. It is quite feasible, however, that Hispanic peoples inhabited the site on a very short term basis. This hypothesis is supported by the discovery of charred wheat or barley seeds in a firehearth within a structure, which produced a date of A.D. 1890 (Beal 1980).

The early cluster of dates probably reflects a Piedra Lumbre Phase Navajo occupation of the site. The structures and the material culture are similar in style to those of the Cerrito Site, which serves as the site type and data baseline for the Piedra Lumbre Phase, an early Navajo manifestation (Schaafsma 1979). Schaafsma (1979) lists the physical manifestations of Piedra Lumbre Phase sites, as shown below:

a) structures of dry-laid stone masonry,
b) Rio Grande Pueblo pottery,
c) lithic tools,
d) limited metal artifacts,
e) settlement pattern ranging from single masonry structures in isolation to communities with as many as 26 loosely grouped structures, and
f) evidence of animal (sheep) husbandry.

Site LA 25322 meets most of these criteria, lacking only metal artifacts. The distribution of radiocarbon dates, however, indicates that the occupation was late enough to potentially have metal items, so the lack of such is probably a result of sampling error.

Site Function

This section discusses the possible functions of the structures investigated, and attempts to determine the role that site 25322 played in the adaptive strategies of its occupants. Data collected by this and previous projects is considered.

Evidence suggests that Feature D served as a short-term habitation. A habitation function is strongly suggested by the masonry structure, the presence of a firehearth, albeit of unknown antiquity, and the presence of ceramics. The structure is similar to structures at other sites in size and configuration that have been demonstrated to have served for habitation purposes (e.g., Schaafsma 1979). That Feature D was inhabited for a short time is suggested by the poor definition of the floors. Extended use would likely result in a compact level with charcoal staining and a scattering of artifacts. The two possible living surfaces excavated in Feature D were not distinct. Extended use would also produce substantial trash deposits near the structure. The numerous test units excavated near the structure do not indicate heavy trash accumulations.

The function of Feature F is more difficult to determine, due to the destruction of the cultural fill by past inundation. While the structure is similar to ones designated as hogans, the structure's small size (less than 1 m in diameter) suggests that habitation would be a bit cramped. Field notes by personnel from the School of American Research suggest that the structure may have functioned as a lambing pen. This is a plausible explanation, although it is also possible that the structure may have been built for shelter by a shepherd, who may have occupied it during a portion of the day, returning to a larger habitation structure located elsewhere on the site for domestic needs.

Possible occupation of the structures by later inhabitants of the Piedra Lumbre Valley may also have been for habitation purposes. The structures evidently offered considerable shelter quality after their abandonment by the Navajo, as evidenced by their present condition. Later occupants constructed firehearths in the structures, and may have executed some alterations, as evidenced by 19th century tree-ring dates obtained by Beal (1980).

While the primary function of the site may have been for habitation purposes, other, secondary functions may also be identified. The presence of lambing pens and corrals suggests that the site was selected partially because of its suitability for animal husbandry. The site is close to a permanent water source, the Rio Chama, and is adjacent to a large expanse of grassland. The site may also have been selected for habitation due to its location near the Rio Chama, a probable route of prehistoric and historic travel.

Subsistence

Little direct evidence of the subsistence practices engaged in by the site occupants was discovered during the investigations. Faunal remains consisted of only four fragmentary bones, which were not identifiable as to species. No pollen or macrofloral evidences of foodstuffs

was found. The presence of lambing pens and corrals suggests that sheep were available for exploitation; it is also likely but undemonstrated that certain food items were hunted, gathered, and possibly obtained in trade. The discovery of barley or wheat seeds in one of the structures by previous investigators indicates that late occupations at the site transported cultivated foodstuffs to the site.

Paleoenvironment

Chronometric and biologic data were insufficient to provide a meaningful reconstruction of the site's paleoenvironment. Some trends are apparent, however; pollen analysis resulted in the identification of species commonly associated with pinyon/juniper environments. This suggests that the environment has remained rather stable since the time of occupation. Since this time span is rather short, this is as expected. Chenopodia and/or amaranthus species, artemisia and high spine compositae pollen was present in the pollen samples, apparently representing on-site disturbance vegetation.

Management Recommendations

Site LA 25322 is a particularly significant site in the Abiquiu Reservoir area. It is one of only three village complexes attributable to the Piedra Lumbre Phase in the area, and so is an important source for comparative data for the newly defined phase.

Since the recording of LA 25322 in 1974, the site has received considerable attention by archaeologists. The School of American Research has prepared a scaled site map showing topography and structures, has stabilized some structures by buttressing them with sandbags, and has conducted a subsurface testing program. Eighteen of the structures, representing 81 percent of the structures identified as hogans, have been tested by the School of American Research. The inclusion of the previously untested Feature F brings the total to 19, or nearly two-thirds of the sites structures. Numerous pollen, soil, tree-ring, radiocarbon and artifact samples have been collected at the site (see Beal 1980), and many have been processed. To date, 16 radiocarbon or tree-ring dates have been processed for the site. While some of the obtained dates are not accepted by the investigators, there remain ten or eleven dates that appear credible.

The testing of the structures indicated in nearly every case that cultural deposits were shallow. None exceeded 25 cm below the present ground surface, and most were approximately 10 cm deep. Floor surfaces appear to be poorly preserved or defined, and not covered by substantial quantities of artifacts. Floor features, specifically hearths, are present, but appear to have been the focus of previous investigations.

A considerable amount of information has been gathered at LA 25322. In spite of the extent of this and previous investigations at the site, and the general lack of depth of cultural deposits, the site still has the potential to yield important information. Important questions that may be addressed by further investigation of the site include the following:

1. Site chronology. While a substantial number of chronometric

dates have been processed, questions concerning the contemporaniety of some habitation structures and the span of Piedra Lumbre Phase and subsequent occupations persist.

2. Subsistence. Additional subsistence data for the site is desirable.

3. Seasonality. The season of occupation and the duration of occupation within a year have yet to be established.

4. Social organization. The spatial organization of contemporaneously occupied or utilized structures need to be studied, to provide insight into the complexity of social organization and possibly information on group or family size.

5. Cultural affiliation. The cultural affiliation of those occupations following the Piedra Lumbre Phase occupations need to be addressed.

6. Intra-site activity areas. A considerable number of surface artifacts, some in apparent association with structures, are present on the site, which may be utilized to discern site activity areas.

The research domains mentioned above can be addressed by further data recovery at LA 25322. Such investigations will be required if the site is threatened by further adverse impacts, necessitating mitigative efforts. In the event of further site impacts, it is suggested that both surface and subsurface investigations be implemented. To discern activity areas and possibly the location of buried features such as extramural hearths, intensive analysis of surface artifacts is necessary. The most thorough method of surface artifact analysis is the location mapping and analysis of all surficial artifacts on the site. This task will involve a considerable amount of time due to the site's large size, but should be practical due to a moderate to low surface artifact density. The next recommended task would be to entirely excavate previously uninvestigated hogans and those hogans subjected to limited testing where the potential for significant buried cultural deposits were encountered. This will entail the excavation of 19 structures. Mitigation of the site would then focus upon the excavation of the extramural areas. It is suggested that the extramural excavations be conducted in two phases. In the first phase, it is suggested that five one meter square test units be excavated at nonrandom locations in the vicinity of each of the habitation structures entirely excavated. The purpose of these units would be to detect the depth of cultural deposits and hence research potential of each extramural area. Then, in a second phase, two extramural areas with the greatest research potential could be selected for more intensive investigation. It is suggested that a series of contiguous excavation units be excavated, to completely expose any hearths or buried artifact concentrations in the extramural area. It is suggested that an area covering 36 m^2 be excavated in the two selected areas; a larger area would likely encounter other structures or topographic features such as drainage bottoms. Lastly, it is suggested that limited excavations be conducted at two of the corrals or lambing pens to confirm function and deter-

mine research value. Two square meters excavated at each of the two features should provide the desired data. Investigations of lambing pens and corrals by the School of American Research suggest that they generally have little in the way of buried cultural deposits. The pen or corral at Feature V and Feature W appear to have the greatest potential to yield data. Person hour estimates for the proposed mitigative tasks are presented in Table 5.

TABLE 5

PERSON HOURS FOR PROPOSED MITIGATION EFFORTS

Task	Feature Designation	Estimated Person Hours
Surface Artifact Analysis		160
Excavation of Habitation Structures		
	B	20
	C	16
	H	16
	I	16
	J	16
	L	14
	M	16
	O	16
	Q	16
	R	16
	S	16
	U	16
	V	16
	X	16
	Z	32
	BB	14
	CC	14
	FF	16
Test excavations of 19 extramural areas:		285
Excavation of 2 extramural areas:		216
Test of 2 corrals		14
	TOTAL	977

CHAPTER IV

SITE LA 25454

Introduction

Archaeological site LA 25454 is an extensive deposit of chipped stone nodules, cores, and debitage. It is located on the first alluvial terrace of the Chama River drainage, immediately west of the point where an east flowing, unnamed intermittent drainage joins with Jaspe Arroyo. The recorded elevation of the site area varies from 6160 to 6240 feet (1878 to 1902 meters). The site was recorded in 1975 by the School of American Research (Schaafsma 1976:54,56) as a pedregal quarry at which lithic raw materials were gathered and partially reduced, presumably over a long period of time. These investigators recognized four discrete concentrations of lithic materials: Concentrations C and B are found on the north side of the unnamed arroyo, while Concentrations A and D occur on the south side. The site is thought to have originally covered an area of 154,800 square meters (430 meters north-south by 360 meters east-west), but episodic inundation by Abiquiu Reservoir has destroyed approximately 70 percent of the site. Recorded surface artifacts include chert, chalcedony, obsidian, and quartzite debitage, and chert choppers and cores; the possibility of subsurface materials was believed to be unlikely.

The scope-of-work for the present project stipulated that the following activities were to be performed at LA 25454:

1) preparation of a site map;

2) controlled surface collections, test excavations, and controlled excavations so as to define intrasite activity areas, assemblage composition, the occupational history of the site, seasonality of occupation, subsistence strategies, temporal chronology, and cultural affiliation and;

3) identification and description of lithic quarry materials.

This chapter describes how data pertinent to these objectives were gathered, the results of this data collection, and interpretations of those results. The headings of the major chapter sections reflect this organizational scheme.

Field Methods

Cultural materials at LA 25454 are strewn across the top of the alluvial terrace on both sides of the unnamed drainage channel. As described in the Introduction, both sides are incorporated within the original site boundaries even though four concentrations of lithic materials were recognized, two on each side of the arroyo (Figures 16 and 17. These

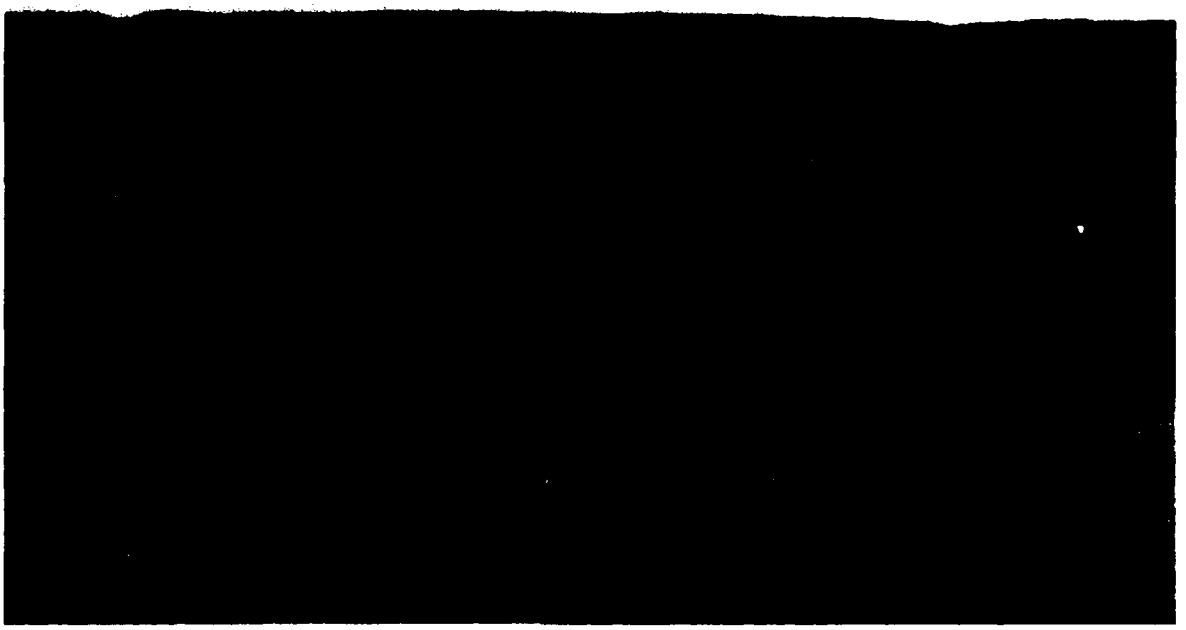

Figure 16. Overview of the North Side of LA25454.

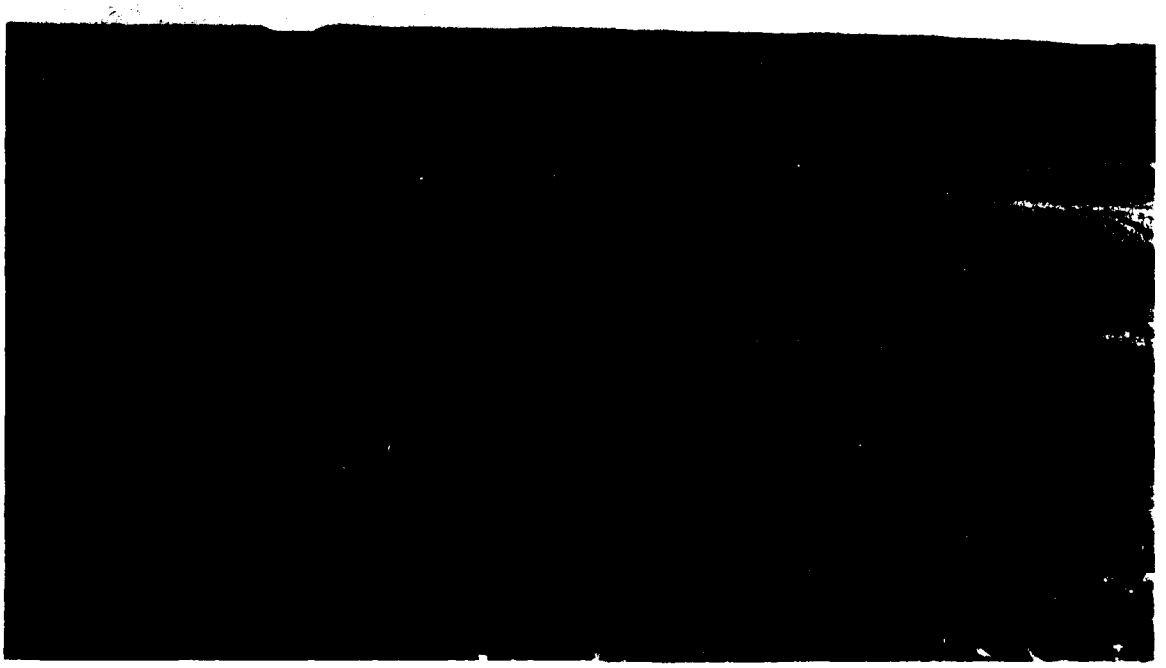

Figure 17. Overview of the South Side of LA25454.

inclusive site boundaries have been retained, but the site area has been segregated into two halves (hereafter referred as the north side and south side), the unnamed arroyo separating these localities. Description and analysis maintain the discreteness of the north side and south side.

The first task was to prepare a site map showing the spatial relationships of cultural features, prepared tools, artifact concentrations and local topographic features. A site datum was established by placing a short length of 1/4" steel rebar in a visible locale adjacent to a two-tracked road. The azimuth and distance from established U.S.G.S. Benchmark 16D, elevation 6216' (1895 meters), to the site datum was determined by Brunton compass and pacing. A mapping station (M.S. 1) was fixed with a wooden stake and provenienced to the site datum on the south side of the site. A second mapping station (M.S. 2) was temporarily set up on slightly higher ground west of M.S. 1 so that the western end of the site area could be visualized and measurements taken.

The search for aboriginal features and artifacts was accomplished using a pedestrian tactic whereby a "scrimmage line" of 6 crew members aligned themselves perpendicular to this meridian, spaced themselves approximately 5 meters apart, and proceeded to walk a series of parallel transects or "sweeps" in a north-south direction from the arroyo edge of the northern and southern limits of the site. At intervals of approximately 33 feet (10 meters), the sweep stopped and each individual inspected an area 2 meters in diameter and tabulated the total numbers of visible artifacts. In addition to locating prepared tools and features, this technique was useful in detecting concentrations of artifacts, as well as the spatial limits of the artifact distribution.

While the surface reconnaissance was being conducted to locate prepared tools and features, a grid oriented true north and consisting of 25 meters square, was superimposed over the map. Each grid unit was numbered to facilitate selection of units for surface artifact analysis and collection.

A random sample of 186 grid units (10 percent of the estimated site area of 46,440 square meters) was selected for intensive analysis. Since the north side was slightly larger in size than the south side, 60 percent (112 units) of the total number of units were allocated to the north side and 40 percent (74 units) to the south side. Units were subdivided into 25 one meter square subunits. These subunits were designated with letters, starting with an A in the upper right hand corner and proceeding back and forth from one side to the other across the square (similar to the way sections are designated within a township on topographic quadrangles) and culminating with the letter Y in the lower left hand corner. Any artifacts found within subunits A, E, U, and Y were collected for later analysis in the lab. Artifacts within the remaining 21 subunits were analyzed in place and not collected. Data obtained from the non-collected lithic artifacts included length, material type, color, stage of reduction, and the presence or absence of utilization or modification, and were recorded on an appropriate inventory form.

As mentioned previously, it was thought that approximately 70 percent of the original site area had been destroyed through episodic inundation by Abiquiu Reservoir. The reservoir waters had risen to a point just below the lowermost terrace level where the site is located (6220 feet-1896 meters). To test the effects of this inundation upon surface artifacts, 10 additional sample units were placed in areas once inundated. Five units were situated between the southern edge of the north side and the bottom of the unnamed arroyo; similarly, five units were located between the north edge of the southern side and the arroyo bottom. All artifacts found within these inundation sample units were inventoried in a manner similar to the other surface units.

To evaluate the suitability of local rocks for the manufacture of lithic tools, 10 quarry analysis units were emplaced, six on the north side and four on the south side. Half of the units on each side measured 1 m x 10 m while the other half were 2 m x 5 m in size. All rocks larger than golf ball size were counted, measured (length, width, and thickness), and classified according to material type and potential flintknapping qualities. Other attributes such as color, origins (river cobble or angular block), and condition (whole or fragmentary), were also recorded. In addition, an eleventh quarry analysis control unit (1 m x 10 m) was placed off-site on the east bank of Jaspe Arroyo, just east of the confluence of the latter with the unnamed tributary which bisects the site. It was inventoried in a manner similar to the other ten units so that the composition of the two groups could be compared.

In addition, 20 test units were excavated with fifteen located randomly while the remainder were placed where the potential for buried cultural materials was highest. The fifteen random test units (referred to as Random Units, or R.U.s) were distributed more or less equally across the site (seven on the north side and eight on the south side). Five excavation units (referred to as Test Units, or T.U.s) were established (four on the south side and one on the north side) in areas where the concentration of surface materials was densest or which seemed likely to contain subsurface cultural remains. Finally, an additional 8 square meters (referred to as Controlled Units, or C.U.s) were excavated in nonrandom locations. All but two of these C.U.s were placed around or near a localized concentration of river cobbles (Feature 1), located in the southwest corner of the south side.

All test units measured one meter square and were excavated in arbitrary 10 cm levels, the dirt being passed through 1/4 inch mesh screen. Portions of artifact bearing strata within the C.U.s were also screened through 1/16 inch mesh so as to recover microlithic materials which might ordinarily be lost with the larger mesh screen. All artifacts recovered from the screen were retrieved and collectively bagged according to unit and arbitrary level. Standard field notes and records were kept, and appropriate photographs were taken. All test units were completely backfilled once the excavations had been completed.

Pollen columns were collected from two test units, one each from the north side and south side in one liter samples from regular intervals of 5 or 10 cm from one wall of the test unit; a sample collected from the modern surface accompanied these columns. Two ground stone specimens, suitable for pollen wash analysis, were also collected.

Results

This section provides specific details on the results of the investigations at LA 25454. The discussion is subdivided into descriptions of surface remains (including those found above and those found below the level of inundation, and the quarry analysis units) and subsurface remains.

Surface Remains - Above Waterline

On-ground inspection and the superimposition of a grid system determined that all cultural materials were enclosed within a roughly elliptical area of 74,650 square meters (approximately 7.5 hectares or 18.4 acres) (Figure 18). The site area is bisected by the unnamed tributary to Jaspe Arroyo into a north side and a south side. The north side is slightly larger, containing 43,400 square meters (58 percent of the total area), as compared to the south side with 31,250 square meters (42 percent). Site reconnaissance located a small number of prepared artifacts and a single feature. In contrast, intensive inventory of artifacts contained within selected grid units discovered and described a much larger assemblage of lithic debitage.

Prepared Implements

The site reconnaissance located nine chipped stone tools and three groundstone items. Identification, location, and dimensions of the artifacts are listed in Appendix B; Figures 19, 20, and 21 illustrate the general morphology of these items. The chipped stone tools consist of four scrapers, two projectile points, two bifaces, and one preform; five of these tools are manufactured of chert, three of obsidian, and one of quartzite. Eight or 67 percent of the artifacts (one point, two bifaces, one scraper, the preform, and the groundstone) were found on the south side; the remainder (three scrapers and one point) were located on the north side.

The two projectile points are generally similar in that they are both triangular in outline, bi-convex in profile, and made of obsidian; there, however, the similarity ends. The larger specimen (F.S. 69) is finely worked on both faces, has straight to slightly convex blade margins, and is corner-notched (Figure 19). Most of the base is absent but enough remains to indicate that the stem was probably expanding; determination of the shape of the basal margin cannot be made. The second point (F.S. 46) is short and squat, irregular in outline (due to one blade margin being straight and the other convex), is not as finely worked, exhibits very shallow side notches, and has a convex basal margin (Figure 19b).

The groundstone consist of a portion of a one-handed mano, and two fragments of a sandstone metate. The mano is one-half or two-thirds of a quartzite river cobble, the use of which has resulted in one smooth surface (Figure 20). The cortex on the opposite face and on both ends has corroded to reveal the granular interior. The two metate fragments fit together to form approximately one half of the original implement, enough to permit a description of its morphology. It was roughly rectangular with rounded corners; its edges were shaped; one surface had

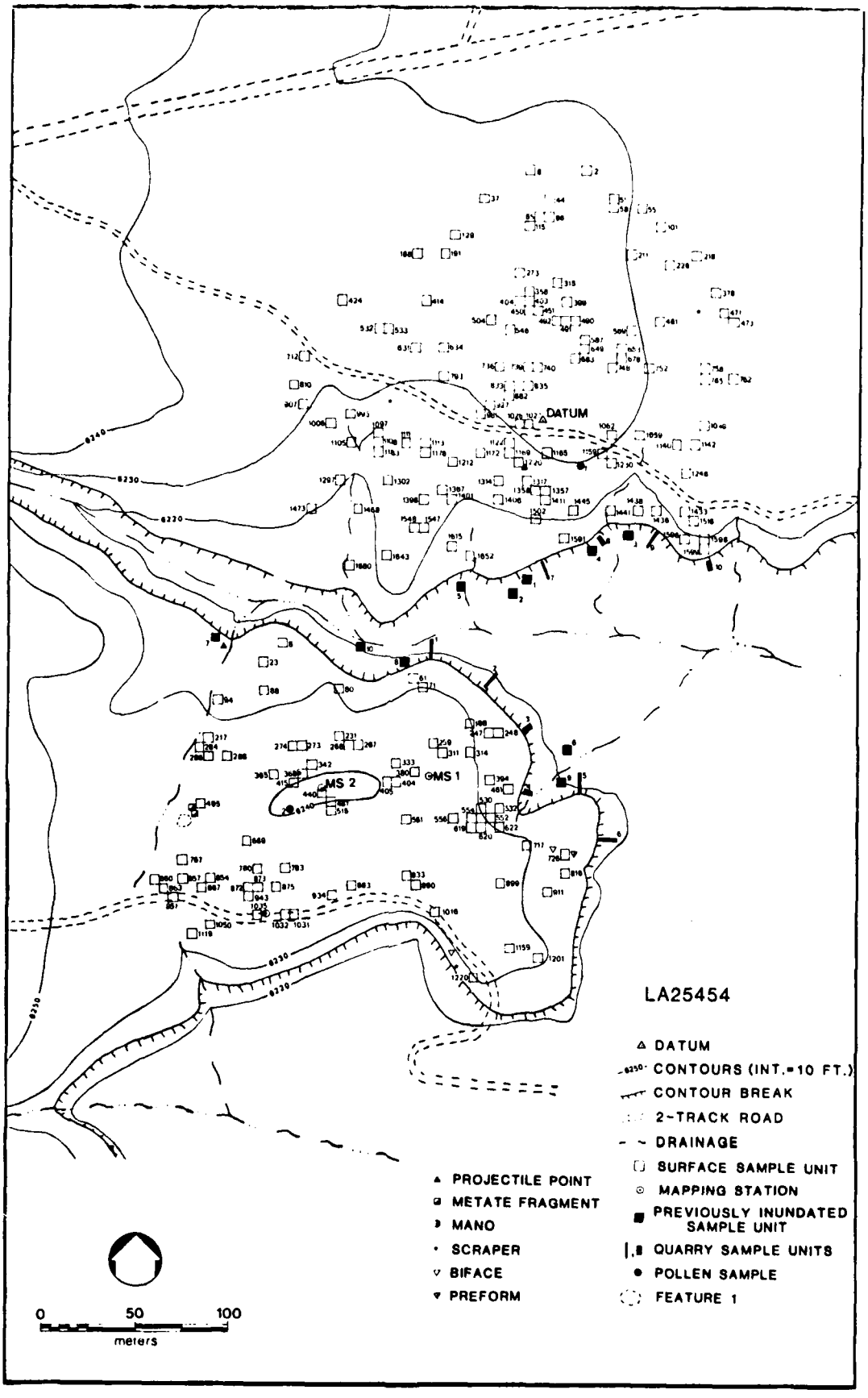

Figure 18. Map of LA25454 showing natural features, prehistoric artifacts and features, and investigation units.

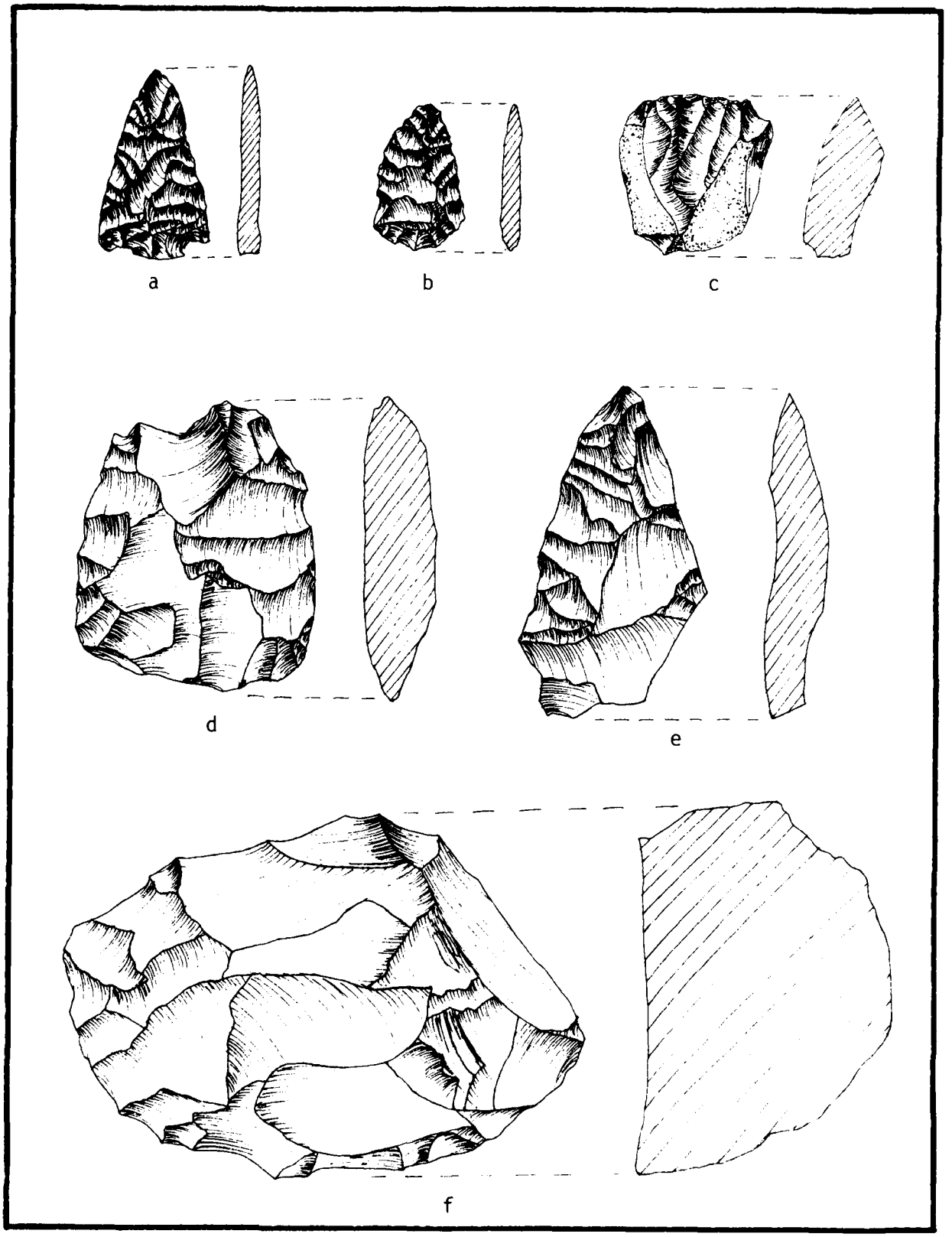

Figure 19. Illustrations of chipped stone tools collected from surface of LA25454: a, projectile point(F.S. 69); b, projectile point(F.S. 46); c, scraper(F.S. 34); d, biface(F.S. 70); e, biface(F.S.72); f, scraper(F.S. 74).

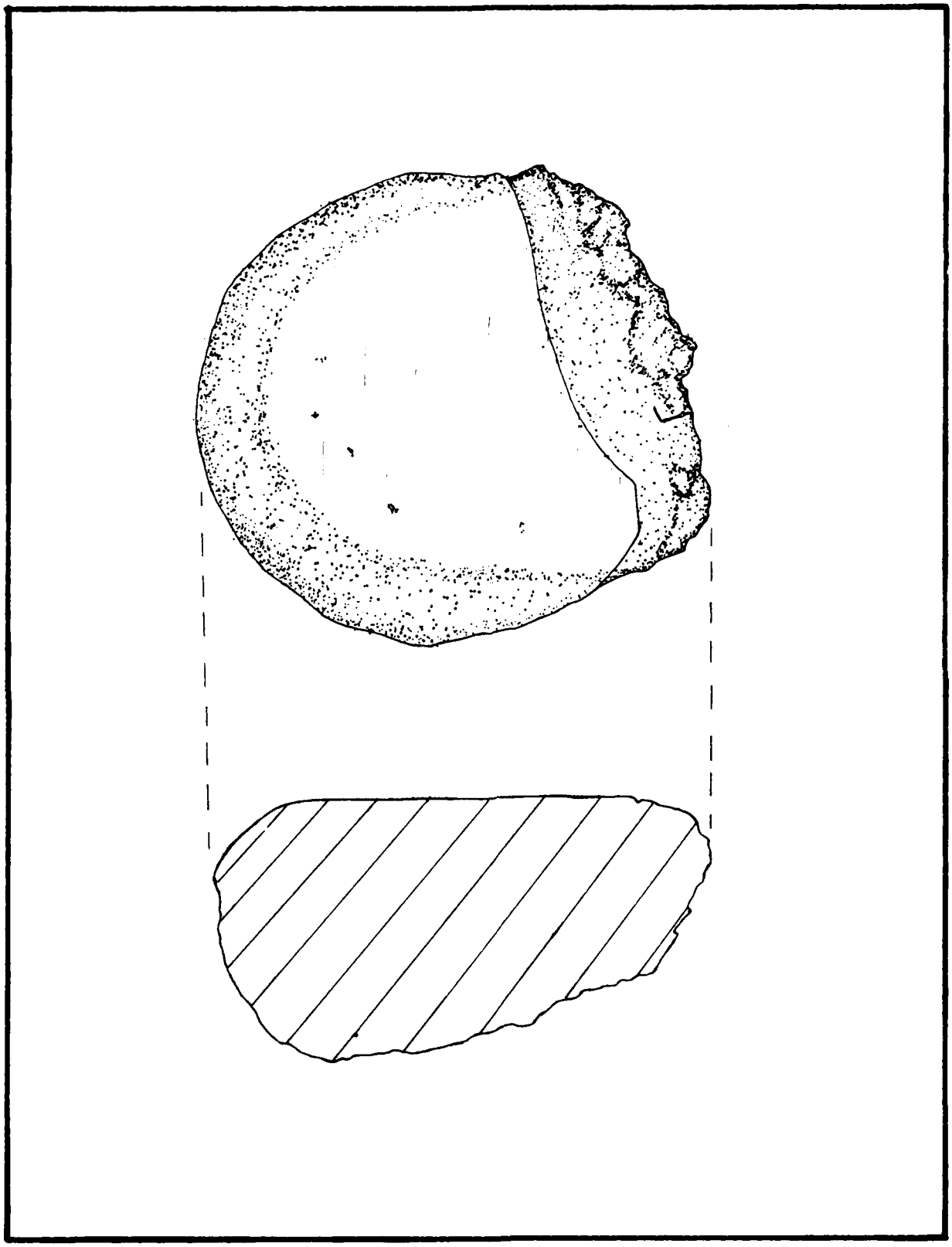

Figure 20. Illustration of mano fragment (F.S. 76) collected from the surface of LA25454.

been used enough to impart a smooth concave profile and a rough, pitted face; and, the opposite face appears to have been partially utilized as well (Figure 21). Both of these groundstone items were found on the south side of the site, the metate fragments in proximity to the feature.

Features

Feature 1, located in the extreme southwest corner of the south side (Figure 18), was visible on the surface as a concentration of approximately a dozen quartzite cobbles within an area of 4-5 meters (Figure 22). Inspection of these surface remains could not confirm its origins. Five excavation units (T.U. 3, C.U. 1-2, and C.U. 7-8), therefore, were emplaced to encompass the majority of the cobbles. The results of the excavations in these units are described in the succeeding section on subsurface results.

Debitage

The collection strategy for debitage has been described in field methods. Each 5 m x 5 m unit was divided into subunits within which all visible artifacts were counted and described. To recap, all artifacts found in the four corners of each 25 one meter square subunit, i.e., Subunits A, E, U, and Y, were collected for more detailed laboratory analyses. The results of these inventories, beginning with those artifacts left in place and followed by the collected items, are described below.

Non-collected Artifacts

A total of 677 artifacts was found, described, and left in place within the 186 surface sample units. The south side possessed 60 percent (409 artifacts) of these remains, while the north side contained the remainder (268 artifacts). The following attributes on these artifacts were recorded: material, color, manufacturing stage, length, and types of modification. Table 6 records the absolute and relative frequencies of the nominal attributes (except color) for both sides of the site. This tabulation reveals that the two localities are closely similar for many of the attributes; the exceptions are notable. The south side contains nearly three times as many obsidian artifacts as does the north side; the latter also does not have any quartzite artifacts. As far as manufacturing stage is concerned, the differences are even more pronounced. On the north side, secondary flakes predominate, followed by tertiary flakes, and primary flakes. For the South Side tertiary flakes are most abundant, followed by secondary flakes and primary flakes. The relative frequency of cores is nearly identical on both sides, and the amount of core shatter is somewhat more abundant on the south side. The seven tools found on the south side consist of 2 hammerstones, 4 scrapers, and 1 preform. Excepting the two battered hammerstones, intentional modification on the artifacts consisted of utilization: substantially more of the north side artifacts exhibited utilization than did those from the south side.

Overall dimensions, as represented by artifact length, some diffences are apparent between the two sides of the site. South side

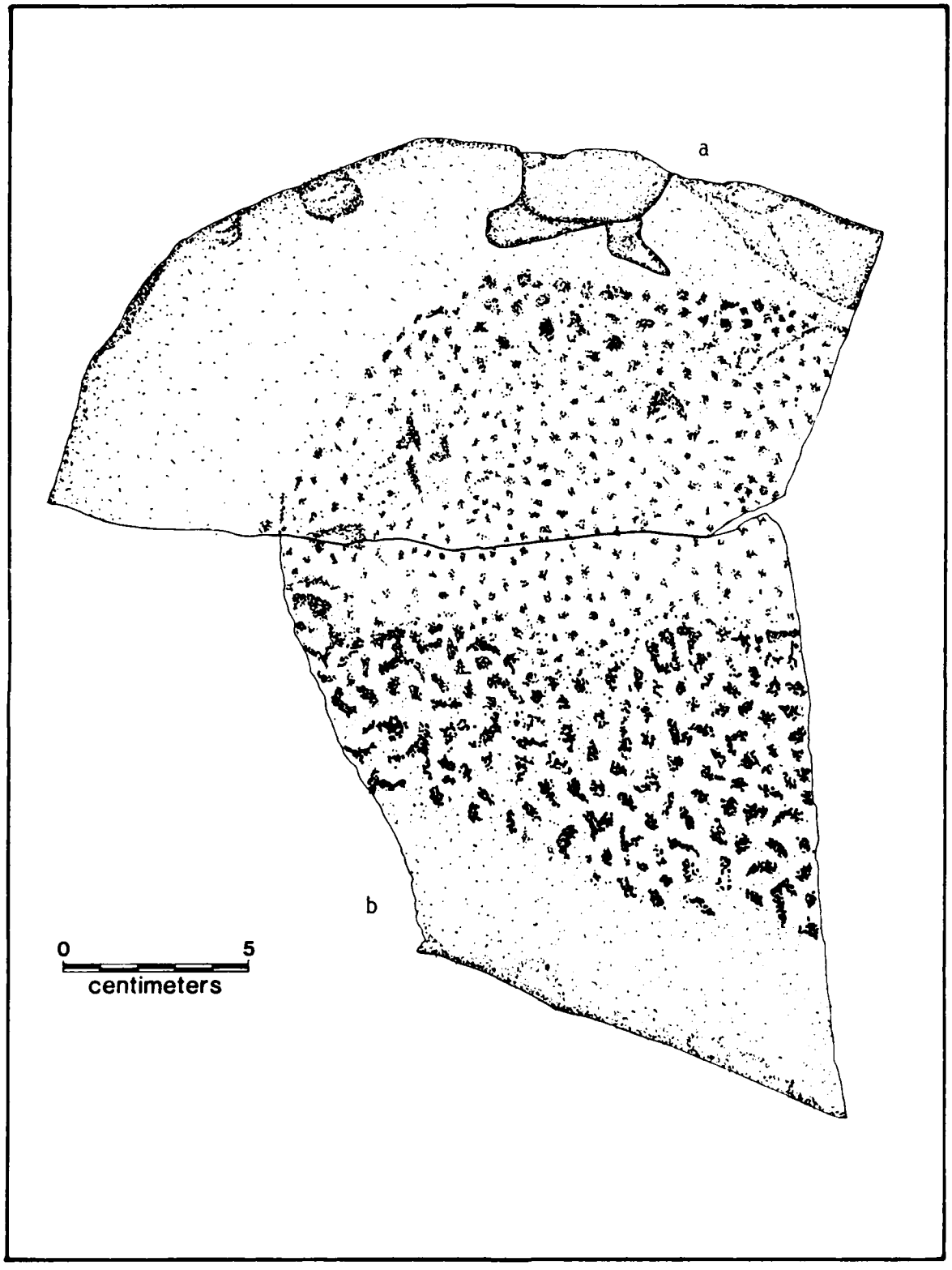

Figure 21. Illustration of metate fragments collected from surface of LA25454: a, F.S. 103; b, F.S. 104.

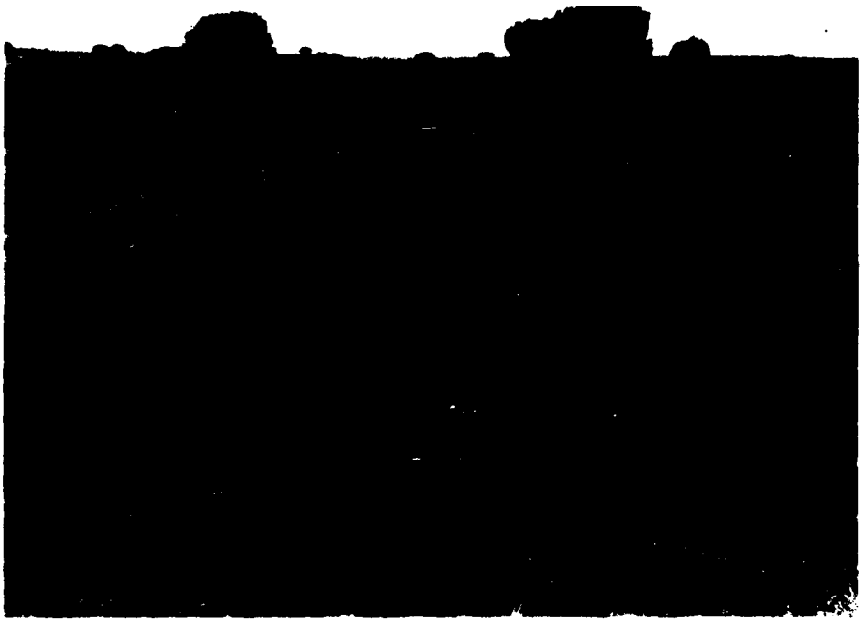

Figure 22. Photo of Feature 1, a concentration of alluvial cobbles in the southwest corner of LA25454. North arrow is situated in the center of the concentration.

TABLE 6
Summary of Attributes for All Non-Collected Lithic Artifacts Recorded within Those Surface Sample Units Above Waterline at LA 25454

Attributes	North Side (N=268)		South Side (N=409)	
	Frequency	Percentage	Frequency	Percentage
Material				
Chert	220	82.1	332	81.2
Obsidian	18	6.7	72	17.6
Quartzite	0	0.0	5	1.2
Other*	30	11.2	0	0.0
Manufacturing Stage				
Core Shatter	4	1.5	10	2.4
Core	12	4.5	17	4.2
Primary Flake	47	17.5	39	9.5
Secondary Flake	137	51.1	88	21.5
Tertiary Flake	68	25.4	248	60.6
Tools**	0	0.0	7	1.7
Modification				
None	245	91.4	398	97.3
Utilized	23	8.6	9	2.2
Retouched	0	0.0	0	0.0
Battering	0	0.0	2	0.5

* Includes mostly chalcedony
** Includes two hammerstones

artifacts vary in length between 6.0 mm and 120.0 mm; the mean is 29.7 mm, with a standard deviation of 20.1 mm. In contrast, the mean length of north side artifacts is 38.7 mm with a standard deviation of 22.6 mm; the range is 26.0 mm to 132.0 mm. These size differences correspond well with the frequencies of the various manufacturing stages; that is, greater numbers of the larger by-products of lithic reduction (primary and secondary flakes) on the north side, with final thinning and tool production better represented on the south side.

It would appear that the process of lithic reduction was continued further on the south side than it was on the north side. If, however, both sides of the site were used contemporaneously, it would seem that the techniques of lithic reduction varied from one side of the arroyo to the other. It might be surmised that the initial reduction of raw materials was performed on the north side, those items later being finished on the south side. One implication in this latter statement is that the south side was more intensively utilized, possibly for an extended period of time. The presence of a possible feature and groundstone artifacts in this area certainly seems to support this supposition. Discussion of activity patterns is continued in the section on Interpretation of Results.

Collected Artifacts

As mentioned above, all artifacts found within the four corner subunits of each surface sample unit were collected. This practice resulted in the collection of 112 chipped stone artifacts: 38 from the north side and 74 from the south side. Analysis consisted of isolating and describing a group of specific morphological characteristics of each artifact which should help provide insights into the parameters of aboriginal lithic technology at this locality and, by comparison with other sites, throughout the immediate region.

Table 7 identifies and describes the nominal variables which were used in the analysis of the chipped stone artifacts collected from LA 25454. The first ten variables serve to assign a unique numerical designation to each artifact and to fix either its precise or approximate location on the site. Each of the remaining 27 variables describes one external characteristic of the artifact; one or more of these variables are grouped into sets which portray such general attributes as size, appearance, and morphology. Table 8 summarizes the absolute and relative frequencies of the 21 nominal level attributes for both sides of the site. Table 9 lists the range (minimum and maximum) and mean values of the 5 interval level attributes for the north side and south side.

If the variables recorded for the non-collected surface artifacts (Table 6) are compared with similar ones in Table 8, i.e., material, manufacturing stage, modification, and length, few significant differences are detected; that is, the two groups are essentially mirror images of each other. Chert is the most preferred material for lithic tool manufacture and the relative frequency of obsidian artifacts is greater on the south side than it is on the north side; more cores and prepared tools are found on the south side; tertiary flakes predominate on the south side, in contrast to the north side where secondary flakes

TABLE 7

Descriptions of Variables used in the Analysis
of Chipped Stone Artifacts collected from LA 25454

Variable Number	Mnemonic	Description
SITE AND ARTIFACT I.D.		
1	SITENO	Site number, preceded by LA25-
2	ARTNO	F.S., artifact, or shot number
HORIZONTAL & VERTICAL LOCATIONS		
3	SURFPT	Surface mapping point (9 = datum)
4	SURFAZ	Azimuth from mapping point (in degrees)
5	SURFDIST	Distance from mapping point (in meters); use decimal and one digit (including 0) to right of decimal
6	SURFUNIT	Surface sample unit designation
7	SURFSUB	Surface sample subunit designation; let A = 1, B = 2,..., Y = 25
8	SUBUNIT	Subsurface excavation unit designation: 1 random unit (R.U.) 2 test unit (T.U.) 3 controlled unit (C.U.)
9	SUBNO	Subsurface excavation unit number
10	SUBDEPTH	Subsurface excavation depth: 1 0-10 cm 2 10-20 cm 3 20-30 cm 4 30-40 cm 5 40-50 cm 6 50-60 cm 7 60-70 cm 8 70-80 cm 9 other interval
ARTIFACT SIZE		
11	LENGTH	Artifact length (in millimeters)
12	WIDTH	Artifact width (in millimeters)
13	THICK	Artifact thickness (in millimeters)
14	WEIGHT	Artifact weight (in grams)

TABLE 7
(Cont'd)

Variable Number	Mnemonic	Description
ARTIFACT APPEARANCE		
15	MATERL	Material type: 1 chert 2 obsidian 3 quartzite 4 igneous other than obsidian 5 other or unknown
16	COLOR1	First color: 1 white 2 yellow 3 red 4 purple 5 brown 6 pink 7 green or blue 8 gray 9 black
17	COLOR2	Second color (same scheme as used for COLOR1; use 0 if there is no second color)
18	COLOR3	Third color (same scheme as used for COLOR1; use 0 if there is no third color)
ARTIFACT TAXA		
19	TAXA	Taxa designation: 0 unmodified or natural 1 core 2 debitage 3 tool
CORE CHARACTERISTICS		
20	CORETYPE	Core type: 1 unidirectional 2 bidirectional 3 multidirectional 4 bipolar 5 other

TABLE 7
(Cont'd)

Variable Number	Mnemonic	Description
CORE CHARACTERISTICS		
21	COREUTIL	Core utilized: 0 no or indeterminate 1 yes
FLAKE CHARACTERISTICS		
22	CORTEX	Percent amount of cortex: 1 50-100 (primary) 2 1-50 (secondary) 3 none (tertiary)
23	PLATPREP	Platform preparation: 0 none or indeterminate 1 crushing 2 grinding 3 faceting 4 removal of proximal-dorsal overhang
24	PLATLENG	Length of platform (in millimeters)
25	PLATWID	Width of platform (in millimeters)
26	BULB	Bulb of force: 0 not discernible 1 salient (pronounced) 2 diffuse
27	LIP	Proximal-ventral lip: 0 absent 1 present
28	FLAKTERM	Type of flake termination: 0 indeterminate 1 feather 2 hinge 3 step 4 outrepasse (overshot)
29	REFLAKE	Location of retouch: 00 none evident 11 unifacial/marginal 12 unifacial/end 21 bifacial/marginal 22 bifacial/end 31 combination of two or more of above categories

TABLE 7
(Cont'd)

Variable Number	Mnemonic	Description
FLAKE CHARACTERISTICS		
30	FLAKUTIL	Location of utilization: 00 none evident 11 unifacial/marginal 12 unifacial/end 21 bifacial/marginal 22 bifacial/end 31 combination of two or more of above categories
31	MARGINS	Shape of margins: 1 parallel 2 sub-parallel 3 divergent 4 ovate 5 irregular
TOOL CHARACTERISTICS		
32	TOOLTYPE	Type of tool: 1 preform 2 biface 3 scraper 4 drill 5 knife 6 projectile point 7 other
33	TOOLOUTL	Outline of tool: 1 triangular 2 ovoid 3 rectangular 4 square 5 other
34	XSECT	Transverse section: 1 plano-convex 2 convex 3 bi-convex (lenticular) 4 diamond 5 rectangular 6 trapezoidal 7 other
35	RETOOL	Retouch: 0 absent 1 present

TABLE 7
(Cont'd)

Variable Number	Mnemonic	Description
THERMAL TREATMENT		
37	THERMAL	Evidence of thermal treatment: 0 none 1 crazing 2 pot lids 3 waxy luster 4 crazing + pot lids 5 crazing + waxy luster 6 pot lids + waxy luster 7 crazing + pot lids + waxy luster

TABLE 8

Summary of Nominal Level Attributes for All Lithic Artifacts Collected from Surface Sample Units at LA 25454

Variable No.	Variable Name	Attributes		North Side (N=38) Frequency	North Side (N=38) Percentage	South Side (N=74) Frequency	South Side (N=74) Percentage
15	MATERL	1	chert	34	89.5	60	81.1
		2	obsidian	4	10.5	13	17.6
		3	quartzite	0	0.0	1	1.4
		4	igneous	0	0.0	0	0.0
		5	other	0	0.0	0	0.0
16	COLOR1	0	none	0	0.0	0	0.0
		1	white	18	47.4	36	48.6
		2	yellow	1	2.6	2	2.7
		3	red	0	0.0	1	1.4
		4	purple	0	0.0	0	0.0
		5	brown	5	13.2	5	6.8
		6	pink	0	0.0	1	1.4
		7	green or blue	0	0.0	0	0.0
		8	gray	10	26.3	21	28.4
		9	black	4	10.5	8	10.8
17	COLOR2	0	none	19	50.0	47	63.5
		1	white	2	5.3	8	10.8
		2	yellow	2	5.3	8	10.8
		3	red	4	10.5	0	0.0
		4	purple	0	0.0	0	0.0
		5	brown	10	26.3	4	5.4
		6	pink	0	0.0	0	0.0
		7	green or blue	0	0.0	0	0.0
		8	gray	1	2.6	3	4.1
		9	black	0	0.0	4	5.4
18	COLOR3	0	none	34	89.5	65	87.8
		1	white	0	0.0	2	2.7
		2	yellow	0	0.0	0	0.0
		3	red	1	2.6	3	4.1
		4	purple	1	2.6	0	0.0
		5	brown	1	2.6	4	5.4
		6	pink	0	0.0	0	0.0
		7	green or blue	0	0.0	0	0.0
		8	gray	0	0.0	0	0.0
		9	black	1	2.6	0	0.0
19	TAXA	0	natural	0	0.0	0	0.0
		1	core	1	2.6	4	5.4
		2	debitage	34	89.5	62	83.8
		3	tool	3	7.9	8	10.8

TABLE 8
(cont'd)

Variable No.	Name		Attributes	North Side (N=38) Frequency	Percentage	South Side (N=74) Frequency	Percentage
20	CORETYPE	1	unidirectional	0	0.0	3	75.0
		2	bidirectional	1	100.0	0	0.0
		3	multidirectional	0	0.0	1	25.0
		4	bipolar	0	0.0	0	0.0
		5	other	0	0.0	0	0.0
21	COREUTIL	0	no	1	100.0	2	50.0
		1	yes	0	0.0	2	50.0
22	CORTEX	1	50-100 (primary)	8	23.5	7	11.3
		2	1-50 (secondary)	11	32.4	4	6.5
		3	none (tertiary)	15	44.1	51	82.3
23	PLATPREP	0	none	34	100.0	59	95.2
		1	crushing	0	0.0	3	4.8
		2	grinding	0	0.0	0	0.0
		3	faceting	0	0.0	0	0.0
		4	overhang removal	0	0.0	0	0.0
26	BULB	0	not discernible	17	50.0	29	46.8
		1	salient	4	11.8	12	19.4
		2	diffuse	13	38.2	21	33.9
27	LIP	0	absent	33	97.1	54	87.1
		1	present	1	2.9	8	12.9
28	FLAKTERM	0	indeterminate	7	20.6	21	33.9
		1	feather	22	64.7	26	41.9
		2	hinge	3	8.8	11	17.7
		3	step	2	5.9	4	6.5
		4	outrepasse	0	0.0	0	0.0
29	REFLAKE	00	none evident	34	100.0	61	98.4
		11	unif/marginal	0	0.0	1	0.6
		12	unif/end	0	0.0	0	0.0
		21	bifacial/marginal	0	0.0	0	0.0
		22	bifacial/end	0	0.0	0	0.0
		31	combination	0	0.0	0	0.0

TABLE 8
(cont'd)

Variable No.	Variable Name	Attributes		North Side (N=38) Frequency	North Side (N=38) Percentage	South Side (N=74) Frequency	South Side (N=74) Percentage
30	FLAKUTIL	00	none evident	33	97.1	59	95.2
		11	unif/marginal	0	0.0	1	1.6
		12	unif/end	0	0.0	1	1.6
		21	bifacial/marginal	1	2.9	1	1.6
		22	bifacial/end	0	0.0	0	0.0
		31	combination	0	0.0	0	0.0
31	MARGINS	1	parallel	5	14.7	2	3.2
		2	sub-parallel	10	29.4	11	17.7
		3	divergent	3	8.8	6	9.7
		4	ovate	2	5.9	13	21.0
		5	irregular	14	41.2	30	48.4
32	TOOLTYPE	1	preform	0	0.0	1	12.5
		2	biface	0	0.0	4	50.0
		3	scraper	2	66.7	2	25.0
		4	drill	0	0.0	0	0.0
		5	knife	0	0.0	0	0.0
		6	projectile point	1	33.3	1	12.5
		7	other	0	0.0	0	0.0
33	TOOLOUTL	1	triangular	1	33.3	3	37.5
		2	ovoid	2	66.7	3	37.5
		3	rectangular	0	0.0	0	0.0
		4	square	0	0.0	2	25.0
		5	other	0	0.0	0	0.0
34	XSECT	1	plano-convex	2	66.7	2	25.0
		2	convex	0	0.0	0	0.0
		3	bi-convex	1	33.3	6	75.0
		4	diamond	0	0.0	0	0.0
		5	rectangular	0	0.0	0	0.0
		6	trapezoidal	0	0.0	0	0.0
		7	other	0	0.0	0	0.0
35	RETOOL	0	absent	0	0.0	5	62.5
		1	present	3	100.0	3	37.5
36	TOOLUTIL	0	absent	1	33.3	3	37.5
		1	present	2	66.7	5	62.5

TABLE 8
(cont'd)

Variable No.	Variable Name	Attributes		North Side (N=38) Frequency	North Side (N=38) Percentage	South Side (N=74) Frequency	South Side (N=74) Percentage
37	THERMAL	0	none	38	100.0	70	94.0
		1	crazing	0	0.0	1	1.4
		2	pot lids	0	0.0	0	0.0
		3	waxy luster	0	0.0	1	1.4
		4	crazing + pot lids	0	0.0	1	1.4
		5	crazing + waxy luster	0	0.0	0	0.0
		6	pot lids + waxy luster	0	0.0	1	1.4
		7	crazing + pot lids + waxy luster	0	0.0	0	0.0

TABLE 9

Summary of Interval Level Attributes for All Lithic Artifacts Collected from Surface Sample Units at LA 25454

Variable Attribute	North Side (N=38)	South Side (N=74)
LENGTH (mm)		
Minimum	10	6
Maximum	89	134
Mean	32.89	37.72
WIDTH (mm)		
Minimum	3	5
Maximum	70	125
Mean	26.24	33.03
THICK (mm)		
Minimum	2	1
Maximum	36	97
Mean	10.76	13.97
PLATLENG (mm)		
Minimum	0	0
Maximum	38	38
Mean	7.35	6.00
PLATWID (mm)		
Minimum	0	0
Maximum	19	18
Mean	3.54	2.74

are most abundant and primary flakes are better represented; and, very few of the artifacts exhibit evidence of intentional modification. For artifact dimensions (as measured by the variable length), however, such similarities between the two groups of artifacts are not duplicated. In particular, the collected artifacts are larger on the south side than they are on the north side, distinctly opposite for those artifacts which were not collected. The discrepancy might be explained by the smaller sample size of the collected artifacts.

The other variables recorded for the collected artifacts contain important information on technological parameters of lithic manufacture for this site. Full discussion on the implications of such data is reserved for Interpretation of Results.

Surface Remains - Below Waterline

As explained above, interest was expressed in evaluating what and how much effect episodic inundation had upon the distribution of surface artifacts. Since both sides of the site (5 units each) were sampled and similar attributes were recorded, comparisons with the sample units above waterline can be made.

Table 10 lists the attributes of those artifacts which were found within the ten sample units below waterline. The most obvious effect of inundation has been to carry away most of the lithic artifacts: the find ratio for the below waterline sample units is 2.6 artifacts/unit and 3.6 artifacts/unit for the non-inundated units. All artifacts are made of chert and only two (both on the south side) exhibited any modification. As one would expect, the greater majority of the debitage on the south side is composed of secondary flakes which usually are larger in size and less likely to be moved around. Such an explanation cannot easily be applied to the north side where tertiary flakes predominate.

Artifacts on the north side vary in length between 2.0 cm and 9.2 cm, the mean and standard deviation being 4.53 cm and 2.44 cm, respectively. South side artifacts, however, have a mean length of 4.69 cm and a standard deviation of 1.53 cm; the size range is 2.5 cm to 8.0 cm. These dimensions tend to support the belief that the primary effect of inundation is to remove the smaller and, hence, lighter artifacts.

Surface Remains - Quarry Analysis Units

An inventory was made of all rocks larger than golf ball size within the ten quarry analysis units; four of the units were located on the north side of the site, six on the south side, and one off-site alongside Jaspe Arroyo. Table 11 tallies the absolute and relative frequencies of all the rocks' attributes, except color and size, for each quarry unit. Comparing the three groups, the following differences can be detected. Quartzite is more abundant on the north side, but other types of materials (mostly basalt and sandstone) predominate on the south side. The ratio of quartzite to other materials for the off-site unit falls between these two extremes. In general, angular blocks are better represented in the north side units than they are on the south side and off-site. A few more fragmented rocks were noted on the north

TABLE 10

Summary of Attributes for All Non-collected Lithic Artifacts
Recorded Within Those Surface Sample Units
Below Waterline at LA 25454

Attributes	North Side (N=14)		South Side (N=12)	
	Frequency	Percentage	Frequency	Percentage
Material				
Chert	14	100.0	12	100.0
Manufacturing Stage				
Core	1	7.1	0	0.0
Primary Flake	0	0.0	0	0.0
Secondary Flake	2	14.3	9	75.0
Tertiary Flake	11	78.6	3	25.0
Modification				
None	14	100.0	10	83.3
Utilized	0	0.0	2	16.7

TABLE 11

Summary of Attributes for Items Recorded Within Quarry Analysis Units[a]

	Quarry Unit	Material			Origin		Condition[b]				Flakability		
		Chert	Quartzite	Other[c]	Cobble	Block	0-1/4	1/4-1/2	1/2-3/4	3/4-1	Low	Medium	High
South Side	Q.U.1	4	28	80	103	9	2	5	5	100	80	28	4
	n=112	(3.6)	(25.0)	(71.4)	(92.0)	(8.0)	(1.8)	(4.5)	(4.5)	(89.3)	(71.4)	(25.0)	(3.6)
	Q.U.2	15	35	108	148	10	0	6	9	143	104	40	14
	n=158	(9.5)	(22.2)	(68.4)	(93.7)	(6.3)	(0.0)	(3.8)	(5.7)	(90.5)	(65.8)	(25.3)	(8.9)
	Q.U.3	18	84	121	220	3	13	16	14	180	115	92	16
	n=223	(8.1)	(37.7)	(54.3)	(98.7)	(1.3)	(5.8)	(7.2)	(6.3)	(80.7)	(51.6)	(41.3)	(7.2)
	Q.U.4	6	47	115	167	1	11	9	19	129	114	48	6
	n=168	(3.6)	(28.0)	(68.5)	(99.4)	(0.6)	(6.5)	(5.4)	(11.3)	(76.8)	(67.9)	(28.6)	(3.6)
	Q.U.5	4	20	76	94	6	2	12	12	74	86	5	9
	n=100	(4.0)	(20.0)	(76.0)	(94.0)	(6.0)	(2.0)	(12.0)	(12.0)	(74.0)	(86.0)	(5.0)	(9.0)
	Q.U.6	9	32	144	154	31	5	16	16	148	160	20	5
	n=185	(4.9)	(17.3)	(77.8)	(83.2)	(16.8)	(2.7)	(8.6)	(8.6)	(80.0)	(86.5)	(10.8)	(2.7)
North Side	Q.U.7	15	79	125	121	98	15	25	24	155	144	62	13
	n=219	(6.8)	(36.1)	(57.1)	(55.3)	(44.7)	(6.8)	(11.4)	(11.0)	(70.8)	(65.8)	(28.3)	(5.9)
	Q.U.8	3	88	120	160	51	4	9	15	183	136	54	21
	n=211	(1.4)	(41.7)	(56.9)	(75.8)	(24.2)	(1.9)	(4.3)	(7.1)	(86.7)	(64.5)	(25.6)	(10.0)
	Q.U.9	3	154	125	274	8	2	9	4	267	142	131	9
	n=282	(1.1)	(54.6)	(44.3)	(97.2)	(2.8)	(0.7)	(3.2)	(1.4)	(94.7)	(50.4)	(46.5)	(3.2)
	Q.U.10	4	68	136	142	66	17	19	19	153	165	32	11
	n=208	(1.9)	(32.7)	(65.4)	(68.3)	(31.7)	(8.2)	(9.1)	(9.1)	(73.6)	(79.3)	(15.4)	(5.3)
Off Site	Q.U.11	7	108	63	160	18	6	16	16	140	125	52	1
	n=178	(3.9)	(60.7)	(35.4)	(89.9)	(10.1)	(3.4)	(9.0)	(9.0)	(78.7)	(70.2)	(29.2)	(0.6)

[a] Relative frequencies (percent) are in parenthese within each cell.
[b] Fragmentary nature of item, expressed in fractions of whole.
[c] Includes igneous (mostly basalt), sandstone, and a few miscellaneous types.

side and the north side units contained a greater percentage of rocks with medium and high flakability. The similarities between the groups are easily discerned: chert is underrepresented and cobbles are most abundant. These cobbles are most likely to be whole or nearly whole, and rocks with an estimated high flakability are not exceedingly abundant.

A multitude of colors - including black, gray, brown, green, red, pink, yellow, and white - were observed. Some size variation was noted but most of the materials consisted of large cobbles.

Subsurface Remains

Twenty-eight test units, each measuring one meter square, were excavated to varying depths at LA 25454. As explained above, 15 of these units (R.U.s) were located randomly on the site, 5 were placed in areas which exhibited the greatest evidence of containing subsurface materials (T.U.s), and 8 units (C.U.s) were used primarily to explore the area around and immediately adjacent to Feature 1 (Figure 23). The excavations in these units resulted in the recovery of 575 chipped stone artifacts. Descriptions of each of the excavation units, exposed cultural features, and recovered artifacts are discussed below under separate headings.

Descriptions of Excavation Units

Random Unit 1 (North Side) - This unit was excavated to 16 cm below PGS (present ground surface). Two natural strata were discerned: Layer 1 (0-6 cm) is a silty sand, reddish brown in color, well-sorted, with dense grass roots; Layer 2 (6-16 cm) is more compact silty sand, reddish brown to tan in color, and well sorted. No artifacts were recovered.

Random Unit 2 (North Side) - This unit was excavated to 37 cm below PGS. Two natural strata were discerned: Layer 1 (0-13 cm) is a fine-grained silty sand, medium brown in color, with organic materials; Layer 2 (13-37 cm) is a fine-grained silty sand, pinkish brown in color, moderately compact with isolated pockets of fine, light brown sand and decomposed rock. Four artifacts were recovered: one chert flake and one hole-in-top evaporated milk can (not collected) from the ground surface, and two chert flakes from the top 10 cm of Layer 1. Six pollen samples (P.S. 3-8) were obtained in 5 cm increments; samples P.S. 3-6 came from Layer 2 and P.S. 7 and P.S. 8 from Layer 1.

Random Unit 3 (North Side) - This unit was excavated to 20 cm below PGS. Two natural strata were discerned: Layer 1 (0-5 cm) is a silty sand, reddish brown in color, containing a few gravels and many grass roots; Layer 2 (5-20 cm) is a silty sand, light brown in color, very compact with some gravels and root penetration. Nine artifacts were recovered: 1 chert flake from the surface, and 8 flakes (7 chert and 1 obsidian) from the top 10 cm of the unit.

Random Unit 4 (North Side) - This unit was excavated to 15 cm below PGS. Two natural strata were defined: Layer 1 (0-10 cm) is a sand, reddish brown in color, moderately loose, and containing gravels; Layer

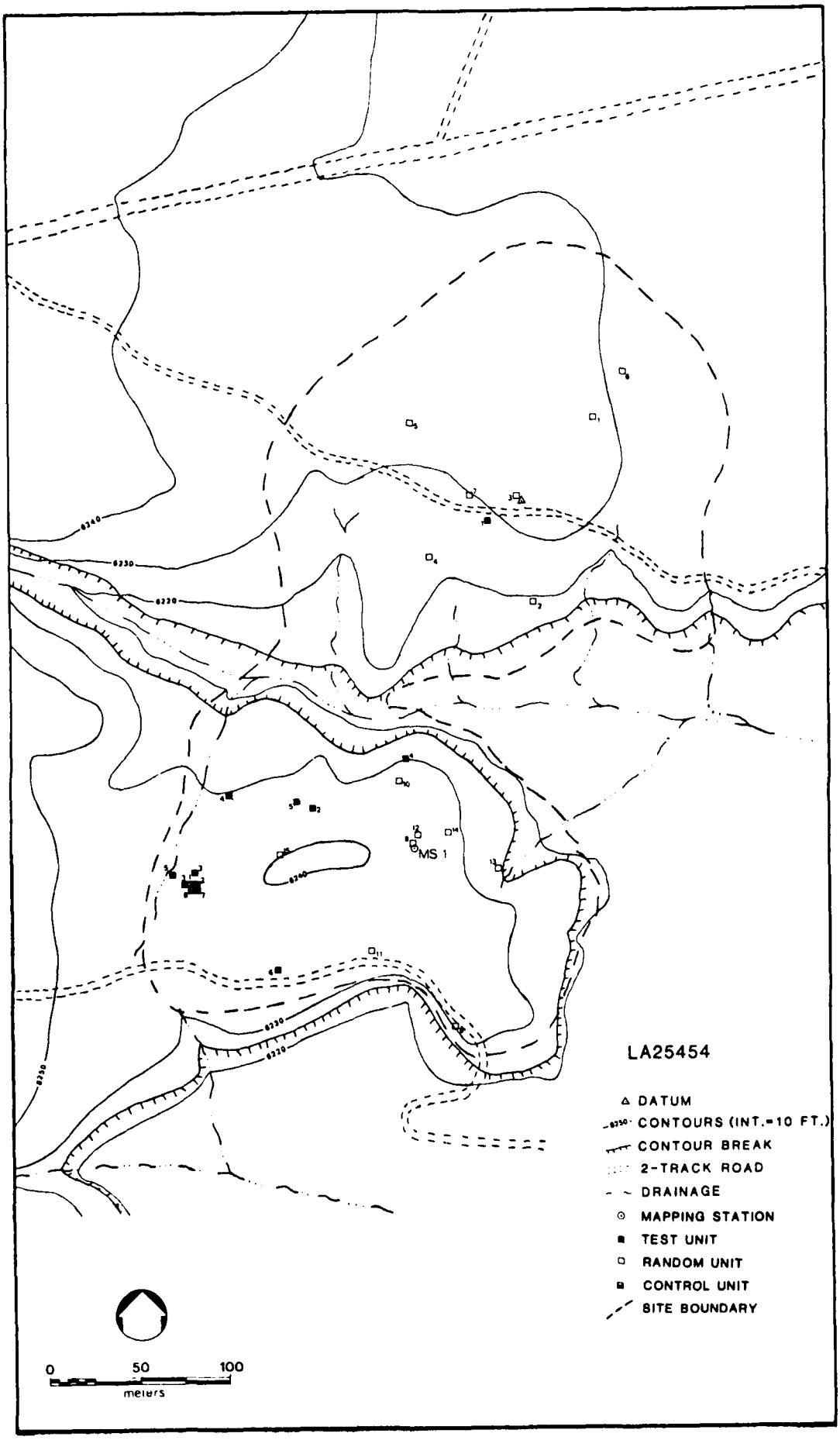

Figure 23. Map of LA25454 showing locations of excavation units.

2 (10-15 cm) is a sand, light reddish brown to tan color, moderately compact, containing gravels and two or three cobbles. No artifacts were recovered.

Random Unit 5 (North Side) - This unit was excavated to 20 cm below PGS. Two natural strata were defined: Layer 1 (0-12 cm) is a fine-grained sandy silt, reddish brown in color, with roots and rootlets; Layer 2 (12-20 cm) is a compact silty sand, pinkish gray in color, with coarse sand and large pebbles. No artifacts were recovered.

Random Unit 6 (North Side) - This unit was excavated to 15 cm below PGS. Two natural strata were discerned: Layer 1 (0-6 cm) is a loose silty sand, reddish brown color, with dense roots; Layer 2 (6-15 cm) is a more compact silty sand, light reddish brown, with roots. One artifact, a chert flake, was recovered from the ground surface.

Random Unit 7 (North Side) - This unit was excavated to approximately 18 cm below PGS. Two natural strata were discerned: Layer 1 (0-4 cm) is a loose silty sand, reddish brown, well sorted with dense roots and few rocks; Layer 2 (4-18 cm) is a compact silty sand, light brown in color, well sorted with continued root penetration. Two artifacts, both chert flakes, were recovered from the very top of Layer 1, possibly on the ground surface.

Random Unit 8 (South Side) - This unit was excavated to approximately 24 cm below PGS. Two natural strata were defined: Layer 1 (0-12 cm) is a sandy loam, reddish brown in color, with many roots; Layer 2 (12-24 cm) is a compact sandy silt loam, reddish brown color, with a few small pebbles. One chert flake was recovered from Layer 2.

Random Unit 9 (South Side) - This unit was excavated to 20 cm below PGS. Three natural strata were defined: Layer 1 (0-2 cm) is an unconsolidated silty sand, yellowish red in color; Layer 2 (2-8 cm) is a compact silty sand, yellowish red in color; Layer 3 (8-20 cm) is a compact sandy clay, yellowish red to mottled tan color. No artifacts were recovered.

Random Unit 10 (South Side) - This unit was excavated to 18 cm below PGS. Four natural strata were defined: Layer 1 (0-8 cm) is a very fine silty sand, reddish brown color, with a few roots; Layer 1a (2 cm thick) is a small lense of very fine silty sand, pinkish gray in color, which is distinguished from Layer 1 by its greater compaction and higher carbonate content; Layer 2 (8-16 cm) is a compact sandy loam, reddish brown, with a few roots and gravel; Layer 3 (16-18 cm) is a compact sandy loam, pinkish gray color, with a carbonate content higher than Layer 2. Fifteen flakes were recovered: 1 obsidian flake from the ground surface and 14 flakes (6 chert and 8 obsidian) from Layer 1 and uppermost portion of Layer 2. The cultural stratum appears to continue to approximately 11 cm below PGS.

Random Unit 11 (South Side) - This unit was excavated to 26 cm below PGS. Two natural strata were defined: Layer 1 (0-16 cm) is a very fine silty sand, reddish brown in color, with a few larger pebbles. Layer 2 (16-26 cm) is a compact sandy loam, light reddish brown color, with inclusions of carbonate material. No artifacts were recovered.

Random Unit 12 (South Side) - This unit was excavated to 24 cm below PGS. Three natural strata were defined: Layer 1 (0-2 cm) is a loose sandy silt, brown color; Layer 2 (2-10 cm) is a compact sandy silt, red in color; Layer 3 (10-24 cm) is a compact sandy clay, light reddish brown color, with a number of small rock fragments and pebbles. One chert flake was recovered from the southeast corner of the unit in Layer 3.

Random Unit 13 (South Side) - This unit was excavated to 20 cm below PGS. Two natural strata were defined: Layer 1 (generally 0-4 cm, with a small area near west wall extending to depth of 10 cm) is a loose sandy silt, yellowish red color, with gravels, large cobbles, and a few roots; Layer 2 (4-20 cm) is a compact sandy clay, reddish brown color, with gravels and cobbles. A lens of gravels was discovered in Layer 2 throughout the southeast corner of the unit. Two very large cobbles were exposed in Layer 2 in the southeast corner. No artifacts were recovered.

Random Unit 14 (South Side) - This unit was excavated to 20 cm below PGS. Three natural strata were defined: Layer 1 (0-2 cm) is a loose silty sand, reddish brown in color, with many roots; Layer 2 (2-8 cm) is a compact silty sand, reddish brown in color; Layer 3 (8-20 cm) is a very compact silty sand, light reddish brown color. A single chert flake was recovered from the top 10 cm of the unit.

Random Unit 15 (South Side) - This unit was excavated to 20 cm (north end) and 27 cm (south end) below PGS. A single natural stratum was defined: Layer 1 is a very fine silty sand, mottled light reddish brown and reddish brown in color, which appears to have been mixed horizontally and vertically, possibly through rodent action; two areas of decomposed rock, pinkish white in color surrounded by reddish gray soil, each measuring approximately 24 cm long by 8 cm deep, were observed in the east wall profile. Seven artifacts were recovered: 6 chert flakes from the surface and 1 chert flake from the top 10 cm.

Test Unit 1 (North Side) - This unit was located near a concentration of surface artifacts and was excavated to approximately 30 cm below PGS. Three natural strata were defined: Layer 1 (0-4 cm) is a sandy silt, reddish brown in color, with a few medium-sized gravels; Layer 2 (4-30 cm) is a compact sandy silt, reddish brown color, without rocks; Layer 3 is a small lens of sand and coarse gravel, dark reddish brown in color with carbonate inclusions, exposed in the extreme northeast corner at 28-30 cm below PGS. No artifacts were recovered.

Test Unit 2 (South Side) - This unit was located in an area with a dense surface scatter of lithic materials and was excavated to 30 cm below PGS. Two natural strata were discerned: Layer 1 (0-16 cm) is a silty sand, brown in color, well-sorted containing roots and some gravel; Layer 2 (16-30 cm) is a compact silty sand, reddish brown color, well-sorted with inclusions of gravel. A total of 513 artifacts, all chert flakes, were recovered form this unit: approximately half were found in Layer 1 and the other half in Layer 2. The cultural stratum appears to continue to a depth of at least 30 cm.

Test Unit 3 (South Side) - This unit was established so as to partially encompass Feature 1, a cobble concentration, and was excavated to

10 cm below PGS. Two natural strata were defined: Layer 1 (0-6 cm) is a very fine sandy silt, brown in color, with roots; Layer 2 (6-10 cm) is a fine-grained sandy silt, reddish brown in color, with occasional inclusions of coarse sand. Two large quartzite cobbles were evident on the surface near the east wall of the unit; these rocks were exposed and pedestalled. Layer 1 contained three chert flakes and 11 possible fire-cracked rock fragments; no artifacts were found in Layer 2. No cultural features other than the two quartzite cobbles were discovered in the unit, and cultural materials appear to extend to a maximum depth of 10 cm, occurring within the uppermost portion of this layer.

Test Unit 4 (South Side) - This unit was placed to test the possibility that cultural materials were more abundant closer to the terrace edge; it was excavated to approximately 30 cm below PGS. Two natural strata were defined: Layer 1 (0-12 cm) is a fine-grained silty sand, medium brown in color, with numerous roots and some gravels; Layer 2 (12-30 cm) is a fine-grained, compact sandy silt, pinkish brown color, with some gravels. A total of 5 artifacts were recovered: 1 chert flake on the surface, 1 chert flake from Layer 1, and 3 chert flakes from Layer 2. Cultural strata continue to a maximum depth of 17 cm.

Test Unit 5 (South Side) - This unit was established near a surface concentration of obsidian artifacts and excavated to a depth of approximately 40 cm below PGS. Two natural strata were discerned: Layer 1 (0-30 cm) is a loose silty sand, reddish brown in color, well-sorted with some roots; Layer 2 (30-40 cm) is a slightly more compact silty sand, light reddish brown color, with a few rocks in the lower reaches of the layer. Fifty-four artifacts were recovered from the unit: 1 obsidian flake from the surface, 31 flakes (13 chert and 18 obsidian) from Layer 1, and 22 flakes (12 chert and 10 obsidian) from Layer 2. Cultural materials continue to the bottom of the excavated unit.

Controlled Unit 1 (South Side) - This unit was established over Feature 1, its west wall adjoining the east wall of T.U.3; it was excavated to a depth of 10 cm below PGS. A single natural stratum was defined: Layer 1 (0-10 cm) is a loose sandy silt, reddish brown in color, with a few roots. Six quartzite cobbles were wholly or partially exposed within the unit at the top of this layer, some of them protruding above ground level. In addition, two small fragments of fire-cracked quartzite cobbles were exposed in the northeast corner of the unit, between two unmarred quartzite cobbles. No chipped stone artifacts were recovered.

Controlled Unit 2 (South Side) - This unit was established over Feature 1, its west wall adjoining the east wall of C.U. 1; it was excavated to a depth of 10 cm below PGS. A single natural stratum was defined: Layer 1 (0-10 cm) is a loose sandy silt, reddish brown in color, with a few roots. Six quartzite cobbles were wholly or partially exposed within the unit at the top of this layer, some protruding above ground level. A single chert flake was recovered from Layer 1.

Controlled Unit 3 (South Side) - This unit was placed a short distance west of the two metate fragments and was excavated to a depth of

20 cm below PGS. Two natural strata were discerned: Layer 1 (0-10 cm) is a loose sandy silt, reddish brown in color, with roots; Layer 2 (10-20 cm) is a compact sandy silt, light reddish brown color, replete with small pebbles. One chert flake was recovered from Layer 1. The maximum depth of cultural materials is approximately 11 cm.

Controlled Unit 4 (South Side) - This unit was placed on a low hill between two shallow drainage channels and was excavated to a depth of 20 cm below PGS. Two natural strata were defined: Layer 1 (0-10 cm) is a loose silty sand, reddish brown in color, with a few gravels; Layer 2 (10-20 cm) is a silty sand, reddish brown color, with a higher density of gravels and a few decomposing rocks. No artifacts were recovered.

Controlled Unit 5 (South Side) - This unit was placed a few meters northwest of Feature 1 to determine the presence of additional subsurface cultural features. It was excavated to a depth of 12 cm below PGS. Two natural strata were defined: Layer 1 (0-4 cm) is a loose silty sand, reddish brown in color, with an intermixture of small gravels; Layer 2 (4-12 cm) is a compact silty sand, reddish brown in color, with a small amount of gravels. No artifacts were recovered.

Controlled Unit 6 (South Side) - This unit was established in the southern portion of the side and excavated to a depth of 21 cm. Two natural strata were discerned: Layer 1 (0-10 cm) is a silty sand, brown color, with roots; Layer 2 (10-21 cm) is a compact silty sand, brown in color, with coarse sand and gravels. Two chert flakes were recovered from Layer 1. The maximum depth of cultural deposits is 12 cm.

Controlled Unit 7 (South Side) - This unit was established over Feature 1, its north wall adjoining the south wall of C.U. 2; it was excavated to a depth of 10 cm below PGS. A single natural stratum was defined: Layer 1 (0-10 cm) is a fine silty sand, brown in color, with a few roots. Nine quartzite cobbles and one sandstone cobble were wholly or partially exposed within the unit at the top of this layer, some protruding above ground level. In addition, 22 quartzite fire-cracked rock fragments were exposed along the west side of the unit. Two chert flakes were recovered from Layer 1.

Controlled Unit 8 (South Side) - This unit was placed over Feature 1, its north wall and east wall adjoining C.U. 1 and C.U. 7, respectively; it was excavated to a depth of 12 cm below PGS. A single natural stratum was defined: Layer 1 (0-12 cm) is a fine-grained silty sand, brown in color, with a few roots. Nine quartzite and two sandstone cobbles were exposed within the unit at the top of this layer, some protruding above ground level.

It would appear from the above descriptions that natural deposits on the site are relatively homogeneous. They consist primarily of a brown or reddish brown sandy silt which increases in compaction with depth and which sometimes contains coarse sand, small gravels, and decomposing rocks. Cultural deposits are generally shallow, usually the top 10 cm. With a few exceptions, artifacts are sparse to non-existent. The exceptions are Test Units 2 and 5, which contain 90 percent of all of the artifacts recovered from the test excavations. Moreover, the

south side contained the greatest number of subsurface remains: a ratio of 28 artifacts per test unit, as compared to the north side with 2 artifacts per unit. The south side also had the only cultural feature discovered on the site - surface or subsurface. This feature is described in detail in the next section; this is followed by a description of the subsurface artifactual assemblage.

Cultural Features

Feature 1 is a relatively small concentration of alluvial cobbles located in the southwest corner of the south side of the site. The tops of many of the stones protrude above ground level (Figure 22). At the outset, the speculation was made that these rocks might represent the location of a temporary structure: circular or nearly circular arrangements of rocks have been found in the area and are presumed to represent the encampments of historic Indian groups (Schaafsma 1978). In order to test the viability of this proposition and determine the horizontal extent of this manifestation, seven test units were excavated: five over the feature itself and two nearby to the north of the cobble concentration.

During this excavation all cobbles and rock fragments were exposed and pedestalled (Figures 24 and 25). The horizontal arrangement is roughly circular. In addition to the ubiquitous quartzite cobbles, the feature also contained three sandstone cobbles and two concentrations of fire-cracked rock (FCR) fragments with the largest (22 rocks) in the southeast corner of the feature and a smaller group (9 rocks) along the southwest edge. As the designation implies, these FCRs are heat fractured but few or none appeared to be reddened or blackened. No charcoal, ash, or concavity were found which would have pinpointed the source of heat fracturing, presumably a firepit of some kind. Given the locations of the FCRs near the south edge of the feature, it is possible to surmise that a firepit may lie in this direction. It is feasible that Feature 1 is cultural and represents the remains of a temporary habitation structure with an external firepit.

Artifact Assemblage

A total of 575 artifacts, all chipped stone, were recovered from 17 of the 28 excavation units. Each of these artifacts has been described and measured according to the same attributes used to describe the collected surface artifacts (see Table 7 for identification and definition of these attributes). Table 12 presents the absolute and relative frequencies of each of the 21 nominal level attributes. Probably the most salient aspect of this tabulation is that all of the artifacts, except for two tools, consist of lithic debitage; no cores were found. Among the debitage, tertiary flakes are overwhelmingly predominant, the secondary flakes being only slightly more numerous than the primary flakes. A small number of the artifacts are made of obsidian, but the greatest number had been fashioned from chert.

As far as size is concerned, subsurface artifacts are generally about half as big as surface artifacts. The lengths of the artifacts vary from 1 mm to 85 mm with a mean value of 17.47 mm; the width range

Figure 24. Photo of Feature 1 at LA25454, upon completion of test excavations. Compare with plan view, Figure 25.

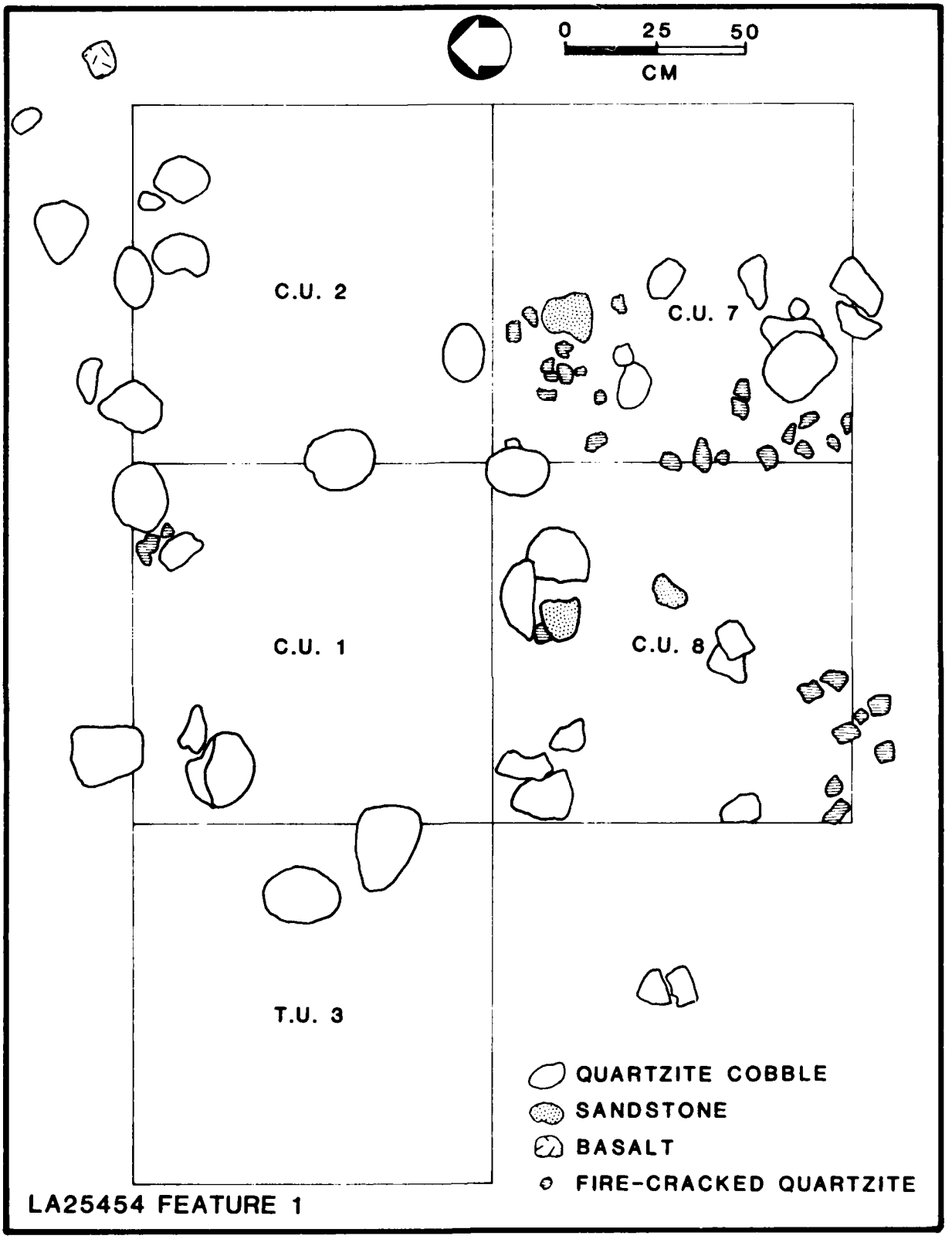

Figure 25. Plan view map of Feature 1 at LA25454.

TABLE 12

Summary of Nominal Level Attributes for All Chipped Stone Artifacts Recovered from Test Excavations at LA 25454

Variable		Attributes		Frequencies	
No.	Name			Absolute	Relative
15	MATERL	1	chert	531	92.3
		2	obsidian	44	7.7
		3	quartzite	0	0.0
		4	igneous	0	0.0
		5	other	0	0.0
16	COLOR1	0	none	0	0.0
		1	white	465	80.9
		2	yellow	4	0.7
		3	red	2	0.3
		4	purple	0	0.0
		5	brown	13	2.3
		6	pink	6	1.0
		7	green or blue	0	0.0
		8	gray	55	9.6
		9	black	30	5.2
17	COLOR2	0	none	355	61.7
		1	white	19	3.3
		2	yellow	36	6.3
		3	red	51	8.9
		4	purple	0	0.0
		5	brown	87	15.1
		6	pink	7	1.2
		7	green or blue	0	0.0
		8	gray	13	2.3
		9	black	7	1.2
18	COLOR3	0	none	539	93.7
		1	white	3	0.5
		2	yellow	10	1.7
		3	red	5	0.9
		4	purple	0	0.0
		5	brown	10	1.7
		6	pink	1	0.2
		7	green or blue	0	0.0
		8	gray	1	0.2
		9	black	6	1.0

TABLE 12
(Cont'd)

Variable No.	Name	Attributes		Frequencies Absolute	Relative
29	REFLAKE	00	none evident	572	99.7
		11	unif/marginal	1	0.2
		12	unif/end	0	0.0
		21	bifacial/marginal	0	0.0
		22	bifacial/end	1	0.2
		31	combination	0	0.0
30	FLAKUTIL	00	none evident	569	99.1
		11	unif/marginal	2	0.3
		12	unif/end	0	0.0
		21	bifacial/marginal	0	0.0
		22	bifacial/end	2	0.3
		31	combination	1	0.2
31	MARGINS	1	parallel	72	12.5
		2	sub-parallel	78	13.6
		3	divergent	83	15.3
		4	ovate	46	8.0
		5	irregular	295	50.5
32	TOOLTYPE	1	preform	0	0.0
		2	biface	1	100.0
		3	scraper	0	0.0
		4	drill	0	0.0
		5	knife	0	0.0
		6	projectile point	0	0.0
		7	other	0	0.0
33	TOOLOUTL	1	triangular	0	0.0
		2	ovoid	0	0.0
		3	rectangular	0	0.0
		4	square	0	0.0
		5	other	1	100.0
34	XSECT	1	plano-convex	0	0.0
		2	convex	0	0.0
		3	bi-convex	1	100.0
		4	diamond	0	0.0
		5	rectangular	0	0.0
		6	trapezoidal	0	0.0
		7	other	0	0.0

AD-A140 677 ARCHAEOLOGICAL INVESTIGATIONS AT FOUR SITES IN THE ABIQUIU MULTIPLE RESOURCE AREA NEW MEXICO(U) NICKENS AND ASSOCIATES MONTROSE CO A D REED ET AL. DEC 83 2/3

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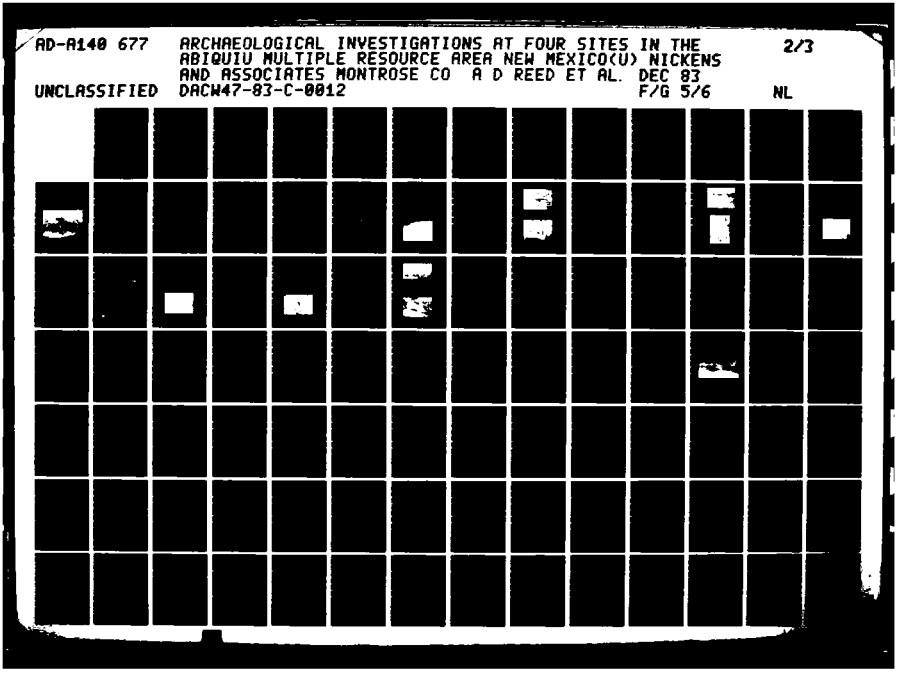


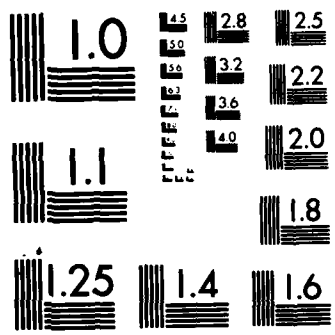


TABLE 12
(Cont'd)

Variable		Attributes		Frequencies	
No.	Name			Absolute	Relative
35	RETOOL	0	absent	0	0.0
		1	present	1	100.0
36	TOOLUTIL	0	absent	0	0.0
		1	present	1	100.0
37	THERMAL	0	none	569	99.0
		1	crazing	3	0.5
		2	pot lids	2	0.3
		3	waxy luster	0	0.0
		4	crazing + pot lids	1	0.2
		5	crazing & waxy luster	0	0.0
		6	pot lids & waxy luster	0	0.0
		7	crazing + pot lids + waxy luster	0	0.0

is 4 mm to 68 mm with a mean value of 15.43 mm; thickness ranges from 1 mm to 34 mm with a mean of 3.43 mm; platform length has a range of 0 to 25 mm and mean of 3.67 mm; and, platform width ranges from 0 to 15 mm with a mean value of 1.26 mm. Obviously, the smaller by-products of lithic tool manufacture, representing the final stages of tool production, are most likely to be found where the disturbing processes of natural erosion are minimized, i.e., below the ground surface. It cannot be said, however, how many and how much these subsurface artifacts were moved around before becoming buried but it can be safely assumed that a greater or lesser degree of movement has occurred. In fact, it is suspected that the very high frequency of subsurface artifacts in T.U.s 2 and 5 is at least partially a result of slope wash inasmuch as these excavation units are located on the side of a hill with a shallow slope. It is surmised, nevertheless, that a concentration of lithic tool manufacture in this latter area partially accounts for this localization of materials.

Obsidian Hydration and Trace Elements Analysis

A small number of obsidian artifacts were recovered from the surface sample units and test excavations. These artifacts can be used not only to supply chronometric dates for the occupation of LA 25454 but also to determine the most likely source(s) of the obsidian and thereby provide information on the parameters of lithic raw material procurement and processing.

A sample of 12 obsidian artifacts were sent to Fred Trembour at the Branch of Isotope Geology, U.S. Geological Survey in Denver for hydration testing. Table 13 presents the results of this analysis, giving the refractive index, hydration thickness, the hydration rate, and the estimated hydration age for each artifact. The estimated mean site temperature of 12.6° C., which is used to calculate the intrinsic hydration rates of refractive index groups, was obtained by reference to published records of the Abiquiu Dam and Los Alamos weather stations (F. Trembour, personal communication 1983). The estimated hydration ages and their accuracy range (± 6%) have been plotted in Figure 26. This plot clearly shows that 83 percent of the hydration ages are clustered at approximately 1400 years B.P. The other two dates of 6000 ± 360 years B.P. and 9000 ± 540 years B.P. do not overlap and may be aberrant.

There is little correlation between artifact recovery depth and hydration age within a test unit. This discrepancy has been noticed at Anasazi sites in Colorado and is thought to be the result of extensive vertical mixing of natural deposits and cultural reuse.

Once the hydration analysis had been completed, the samples were returned to Nickens and Associates and subsequently sent out to A & G Analyses of Provo, Utah for analysis of chemical composition. Table 14 presents the results of this chemical analysis and identifies, in the last column, the probably geologic source area(s) for the samples. As shown, all 12 samples appear to have originated at A, which has as its source Polvadera Peak in Rio Arriba County, just southeast of Abiquiu Reservoir.

TABLE 13

Results of Obsidian Hydration Analysis
on Samples Collected from LA 25454
Abiquiu Reservoir Area

F.S. No.	Provenience Location	Provenience Depth	Refractive Index	Hydration $(\mu m)^2$	Hydration Rate at 12.6°C, $(\mu m)^2/10^3$ years	Hydration Age, Yrs. B.P.
34	South 368F	Surface	1.483	9.7	6.7	1400
39	North 835U	Surface	1.483	9.9	6.7	1500
82	North 273E	Surface	1.483	9.9	6.7	1500
88	R.U. 10	0-10 cm	1.482	50.1	8.4	6000
88	R.U. 10	0-10 cm	1.482	76.0	8.4	9000
112	T.U. 5	Surface	1.483	9.2	6.7	1400
113	T.U. 5	0-10 cm	1.483	9.1	6.7	1400
113	T.U. 5	0-10 cm	1.483	9.1	6.7	1400
115	T.U. 5	20-30 cm	1.483	8.6	6.7	1300
116	T.U. 5	30-40 cm	1.483	9.1	6.7	1400
119	T.U. 5	40-50 cm	1.483	9.7	6.7	1400
119	T.U. 5	40-50 cm	1.483	9.2	6.7	1400

* Reference: F. Trembour, personal communication 1983.

TABLE 14

Results of Analysis of Chemical Composition for Sample of Obsidian Artifacts Collected from LA 25454

Sample Number	Provenience	Hydration Analysis I.D. Number	Chemical Composition[a] Rb ppm	Sr ppm	Y ppm	Zr ppm	Nb ppm	MnO %	Fe_2O_3 %	TiO_2 %	Ba ppm	Na_2O %	Obsidian Source
1291	FS34	N6A 14	147.2	7.7	29.8	113.5	63.9	.066	.63	.087	17.1	4.61	A
1292	FS39	N6A 18	150.3	11.1	28.2	107.5	63.7	.067	.80	.105	20.9	4.70	A
1293	FS82	N6A 7	145.9	11.4	25.2	109.3	59.9	.066	.59	.089	10.8	4.64	A
1294	FS88	N6A 12	148.7	8.4	31.1	112.9	61.0	.067	.76	.090	20.2	4.69	A
1295	FS88	N6A 13	148.2	9.1	22.9	105.2	51.8	.677	.73	.097	20.0	4.68	A
1296	FS112	N6A 6	150.0	13.1	17.4	95.8	53.7	.065	.57	.087	19.5	4.66	A
1297	FS113	N6A 10	147.4	10.0	24.2	107.5	58.7	.066	.57	.087	20.6	4.67	A
1298	FS113	N6A 11	149.0	9.2	29.5	114.8	60.3	.066	.60	.091	17.1	4.74	A
1299	FS115	N6A 3	145.4	10.0	29.8	110.7	62.7	.066	.54	.089	18.5	4.69	A
1300	FS116	N6A 9	150.5	7.6	27.3	109.9	63.0	.065	.55	.088	18.6	4.67	A
1301	FS119	N6A 4	147.4	6.2	38.0	119.2	64.1	.066	.56	.090	20.3	4.68	A
1302	FS119	N6A 5	147.3	7.1	32.6	115.3	68.9	.066	.57	.088	20.2	4.66	A

[a] ppm = parts per million

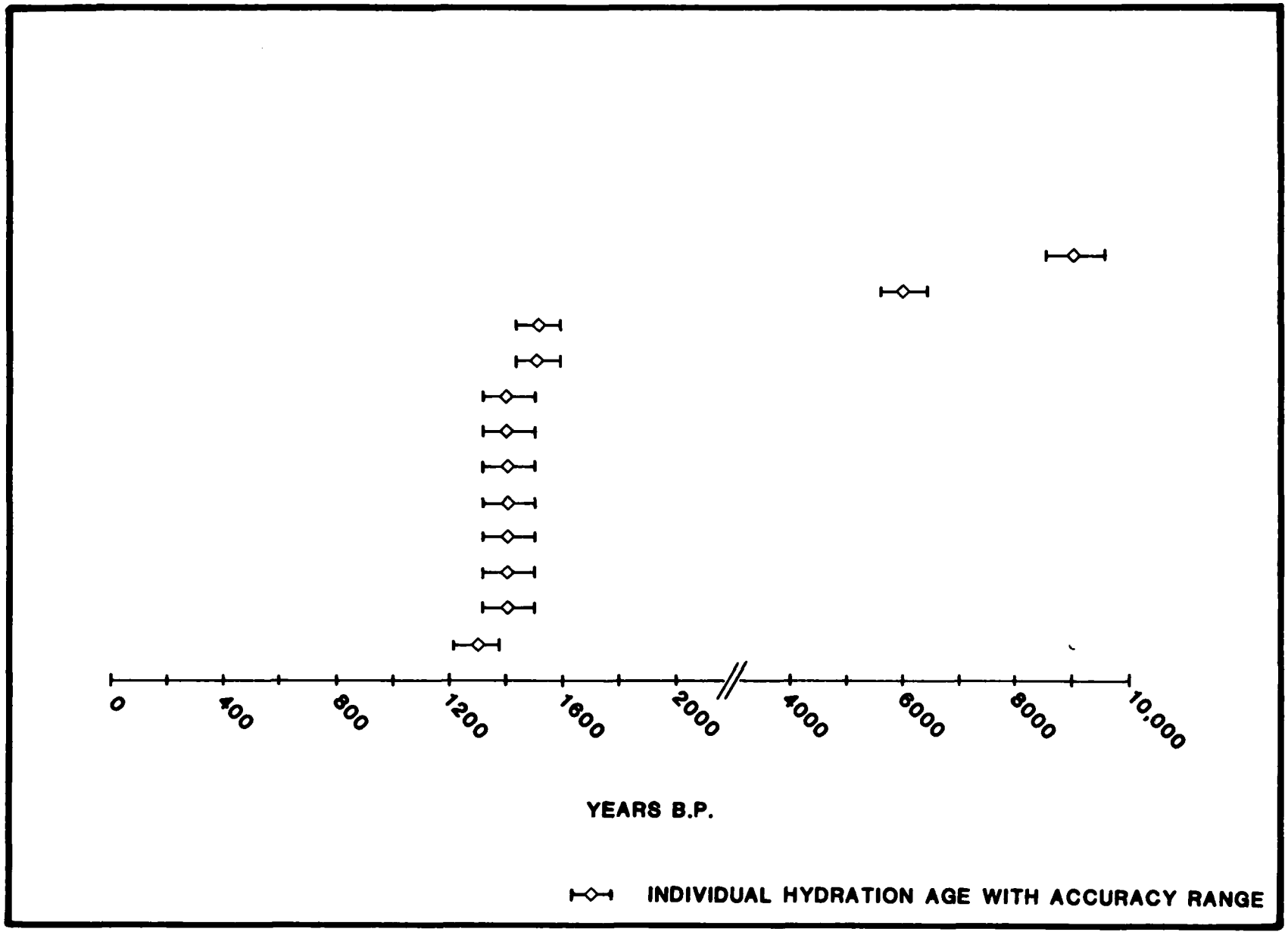


Figure 26. Hydration ages for sample of obsidian artifacts collected from LA25454.

Pollen Analysis

Two groups of soil samples were collected for pollen analysis, and were submitted to Palynological Analysts of Montrose. One group of six samples was taken from the north wall of Random Unit 2, on the north side of the site, at 5 cm depths to 30 cm below PGS. A second group of four samples was obtained from the south wall of Test Unit 5, on the south side, at 10 cm depths to 40 cm below PGS. Both groups of samples were accompanied by one sample each from the modern ground surface of the north side and the south side. In addition, the two metate fragments were collected so that a pollen wash could be performed on the surface which was partially buried. The results of the pollen analysis from the samples and washes are described in a separate report by Linda Scott, included here as Appendix A.

Interpretation of Results

The focus of the preceding sections of this chapter has been upon a description of the cultural information which was gathered from archaeological site LA 25454 and the methodological procedures which were employed to gather that information. To achieve some understanding of the cultural activities which took place at this locality, paleoenvironmental conditions, chronology, site function, and subsistence are considered.

Paleoenvironment

Information on paleoenvironmental conditions is derived primarily from the analysis of pollen remains contained in the natural deposits at the site. The conclusions of Scott's report are abstracted and presented in this section.

Modern vegetation in the region is dominated by the pinyon/juniper community. Specific vegetation at LA 25454 consists of a few junipers scattered along the terrace rim, snakeweed, yucca, cholla, and various grasses. The deeper pollen samples (from both sides of the site) reflect a relatively stable pattern of vegetation for at least the last 1400 years. The local and regional vegetation included a pinyon/juniper woodland with an understory of Cheno-ams and grasses; sagebrush appears to have been more common in the past than the present. Clearance of native woodlands in the recent past in order to increase the size of grazing lands has resulted in a concomitant reduction in understory and shrub vegetation (particularly the Cheno-ams) throughout the area.

The pollen record indicates, therefore, that the composition of the local and regional vegetational communities - and, by extrapolation, climatic parameters - was relatively stable for at least 1400 years. This stability has been disrupted in the historic past by the increase in grazing lands through elimination of some of the native woodlands, and most recently by the construction of the Abiquiu Dam and the consequent inundation of large areas.

Chronology

Chronology for the occupation of the site is achieved through consideration of two sources of information: artifactual typology and obsidian hydration analysis. Only two typologically identifiable artifacts were found at LA 25454. These consist of two obsidian projectile points, specimens F.S. 46 and F.S. 69. These points are similar to some of those which are associated with the En Medio Phase of the Oshara Tradition, lasting 800 B.C. to A.D. 400 (Irwin-Williams 1973). This phase represented a transition from the mobile, Archaic lifeway of the Oshara Tradition to the more sedentary existence of the Basketmaker Tradition with its greater emphasis upon the exploitation of domesticated resources. Schaafsma (1976:148) mentions that a small cluster of En Medio points occur between Comanche Canyon and Arroyo del Chamiso, an area located approximately one mile to the north-northeast of LA 25454 on the opposite side of the Rio Chama.

The obsidian hydration analysis on 12 obsidian artifacts produced a series of hydration ages which ranged from 1200 to 9000 years B.P. However, ten of these dates were clustered at approximately 1400 years B.P. The other two dates were sufficiently separated from this cluster and each other indicating they are aberrant.

Combining the results of these two techniques, it may be concluded that at least one occupation at LA 25454 occurred sometime between 1222 years B.P. and 1590 years B.P. (A.D. 363 to A.D. 761), but most likely at approximately 1400 years B.P. (A.D. 583). The occupants of this particular site seemed to practice primarily an Archaic lifestyle and can, therefore, most practically be incorporated within the Oshara Tradition.

Site Function

From its initial recording, it has been assumed that LA 25454 was an aboriginal lithic quarry; that is, a locality where local lithic raw materials were procured - or to which they were carried from some other locality - and reduced either to a finished tool or to more manageable proportions for further reduction at another locality. Stated explicitly, one of the major purposes of the present investigation was to determine the validity of this assumption: Was the site a lithic quarry and were site activities confined solely to the manufacture of chipped stone implements? If this assumption is wholly or partially inaccurate, alternate explanations must be proffered. Another question, one which was raised during the performance of field activities, concerns the relationship of the two arbitrarily defined sides of the site: Was the aboriginal occupation of the north side and the south side contemporaneous and were similar activities performed in each area? A contrary proposition would declare that the unnamed arroyo separating these two areas had an effect upon when and how these localities were utilized.

The word quarry has often been used to encompass a relatively heterogeneous group of sites which usually share a singular characteristic: lithic tool manufacture. Such indiscriminant use of the term not only violates what should be a very strict definition but may also obscure important details of the lithic manufacturing process. The

term quarry should be reserved for those localities where an exploitable source of raw material is exposed; bedrock outcrops are the most obvious examples. It is possible to stretch the definition to include gravel deposits containing boulders and cobbles of raw material. The two localities could be nearly identical in the composition of the by-products of lithic reduction; that is, relatively similar frequencies of cores, primary-secondary-tertiary flakes, and bifaces or preforms. The similarities notwithstanding, the procedures used, and tools needed, to extract knappable raw material fragments should differ at each locality. At a bedrock outcrop, the workers may need to remove shallow soil cover. Strong and efficient digging implements are required for such a task. Once the outcrop is exposed, the formation may be naturally fractured enough that manageable pieces can be removed fairly easily; however, for homogeneous and dense formations this recovery process may involve more work, sophisticated techniques, and a different collection of tools. Fire and/or hot water might be used to induce fractures in the rock, strong prying tools then inserted into the fractures to loosen and dislodge fragments. At gravel deposits, suitable raw materials can usually be obtained with less effort.

The predominant raw material for artifacts found at LA 25454 is chert. Most of this chert is either white or gray, white being most predominant and often flecked with yellow, brown, red, or black spots; it is massive and fractures conchoidally. Although no chemical sourcing analyses were performed on these chert pieces, the above description closely fits that of Pedernal chert. Pedernal chert is a member of the Tertiary Abiquiu Formation. This horizon outcrops along the flanks of Cerro Pedernal and continues as far as approximately 20 miles west to the San Pedro Mountains (Bryan 1939; Church and Hack 1939). The latter authors describe the chert as massive, with conchoidal fracturing, and colored white to pearly gray, sometimes with black bands, weathering producing pinks, reds, and yellows. Direct aboriginal exploitation of the chert horizon has been observed at at least three areas on Cerro Pedernal: the southwest, west, and northwest sides. Bryan (1939:18) notes that this is the only source in central New Mexico from which large pieces of chert can be obtained.

Cerro Pedernal is located approximately 7 miles (11 km) south-southwest of LA 25454. Its proximity renders it entirely possible that local aboriginal groups were journeying to its flanks to extract suitable fragments and transport them to LA 25454 for reduction. Since it has been established that Polvadera Peak was a source of obsidian for the site occupants, it might be speculated that special trips were made to obtain the obsidian with a stop being made at Cerro Pedernal on the way back. This scenario is complicated, however, by the fact that blocks and cobbles of Pedernal chert are available in the alluvial gravels exposed along terrace slopes and in Jaspe Arroyo and other drainages near the site. It would have been much easier, therefore, to gather up a suitable supply of chert from these gravels and transport them a short distance to the tops of the terrace. Inventory of the quarry analysis units revealed, however, that the relative frequencies of chert pieces is very low. This fact does not necessarily militate against exclusive use of these gravels since the flakes found on the site could conceivably have been produced from a few very large chert

cobbles or blocks. More likely, both sources were used: a supply of chert was gathered from Cerro Pedernal (or nearby in other outcrops) and replenished or augmented by pieces from the alluvial gravels.

Once the raw material was obtained, it was carried to the site area and there reduced to preforms, bifaces, scrapers, and projectile points. Since more artifacts were observed and recorded on the south side than on the north side, it must be concluded that the majority of activities took place on the south side. The artifact assemblage from the north side contained more primary and secondary flakes than did the south side, the latter having greater numbers of tertiary flakes and finished tools. This observation suggests that the final finishing stages of tool manufacture were most likely to have taken place on the south side. It may even have been the case that local materials, i.e., chert, were "roughed out" on the north side and returned to the south side for final shaping. This possibility appears to be tentatively supported by the lower frequencies of obsidian on the north side, as expected if this raw material was being returned to a central processing locality. Such a postulated relationship between occupation of the two sides of the site assumes that they were contemporaneous. This may not be the case since the hydration ages for the two samples collected from the north side (Sample Units 273 and 835) are both 1500 years B.P., whereas most of the hydration ages on the south side are 1400 years B.P. However, this temporal distinction is not unequivocal since the accuracy ranges of these two age groups do overlap.

The previous section discussed the detailed manner in which a series of morphological attributes were recorded on each of the artifacts recovered from surface sample units and the test excavations. These attributes are examined here. Newcomer (1971) describes the results of his attempts to reproduce paleolithic handaxes and asserts that stages in the manufacture of such tools may be defined by studying the waste flakes alone. Handaxe manufacture is characterized by three stages, the by-products (waste flakes) of each stage exhibiting distinctive attributes.

Stage 1 - Rough Out

A. large areas of cortex
B. thick flakes
C. well developed bulbs and cones of percussion

Stage 2 - Thinning and Shaping

A. thin flakes with feathered edges
B. poorly marked undulations on ventral surface
C. curved in profile
D. hard hammer flaking
    1. salient bulb
    2. no proximal-ventral "lip"
E. soft hammer flaking
    1. diffuse bulb
    2. proximal-ventral "lip"

Stage 3 - Finishing

A. flakes similar to Stage 2 but shorter and thinner.

Some of these characteristics have been recorded on the LA 25454 artifacts. Considering Table 8 (surface artifacts) and Table 12 (subsurface artifacts) together, some insights into the tool production process for the site as a whole may be derived. Most of the debitage is generally characterized by the following attributes: little or no cortex (tertiary flakes); practically no visible platform preparation; diffuse bulb of percussion on those items for which a bulb was discernible; feather fracture at the flake terminus, and no proximal-ventral lip. Combining these attributes, these artifacts appear to represent the second stage of tool manufacture in which the roughouts are thinned and shaped; some finishing may also be taking place. It would also appear that soft hammer flaking was the preferred percussion technique inasmuch as the greater percentage of flakes exhibit a diffuse bulb of percussion. This conclusion is contradicted somewhat, however, because relatively few flakes have a proximal-ventral lip, a characteristic usually associated with soft hammer flaking. This discrepancy might be explained by provenience; Tables 8 and 12 suggest that buried flakes are more likely to retain the proximal-ventral lip. It may also be a commentary on the accuracy of Newcomer's criteria for determining the percussion technique; that is, such criteria may not hold true under all conditions irrespective of time and place.

Comparing the two sides of the site, the preliminary stages of tool manufacture (primary and secondary flakes) are better represented on the north side than on the south side. It may also be seen that a greater percentage of flakes on the south side exhibit a proximal-ventral lip, a fact which corresponds better with the predominance of flakes with a diffuse bulb of percussion. Greater variation in the type of flake termination is apparent among the north side artifacts than for the opposite side. It is still the case that the majority of flakes terminate in feather fractures but there are twice as many incidences of hinge fractures in the north side assemblage. Considering these comparisons, it is feasible that raw materials (mostly chert) were being roughed out on the north side and later finished at another locale, possibly the south side. It was to the latter side where most of the few obsidian pieces were being transported and transformed into finished tools. The focal position of the south side seems to be strengthened by the presence of a cultural feature and groundstone.

Feature 1 was visible on the surface as a small concentration of alluvial cobbles. Emplacement of five excavation units around the feature, and two more in the nearby vicinity, did not greatly clarify its function. Very few artifacts were recovered, no occupational surface was detected, and other manifestations such as charcoal, ash deposits, or pits were absent. However, a few fire-cracked rock fragments were exposed along the south side of the cobble concentration, a fact which leads us to suppose that a firepit, or some other feature wherein these rocks may have been heated, lies somewhere to the south outside of the excavated areas. Despite these somewhat disappointing results, no doubt

this concentration of cobbles is cultural in its origins. Its presence, along with the metate fragments which are located nearby, suggests that the site occupants were encamped at this locality for a period of time, possibly only a few days, and that activities other than lithic tool manufacture had taken place. Such activities minimally would include the hunting of local fauna (as suggested by the projectile points) and the gathering and processing of vegetal resources (as the metate, and possibly some of the utilized artifacts, indicate). The fire-cracked rocks could mean that some or all of these foodstuffs were being cooked, or that a firepit was constructed solely for warmth. However mobile the site occupants were, this site is not believed to have been a permanent, or even semi-permanent, camp; such a facility undoubtedly lay elsewhere, possibly closer to the Rio Chama.

Subsistence

Very little information on the subsistence practices of the site inhabitants is available: no animal bone, charcoal, or charred plant parts were found which would provide evidence of what the people were eating. This paucity of such data is mostly attributable to the temporary nature of the site occupation. Two indirect lines of evidence are present, however, which do provide some insights on this subject.

First, two projectile points were recovered from the site. Second, the presence of groundstone (one metate and one mano) on the site suggests the exploitation of local vegetal resources. It is not known whether floral or faunal resources made equal contributions to the local diet, or whether one or the other figured more prominently. In an effort to determine what kind of plants might have been exploited, the two metate fragments were collected and one use surface subjected to a pollen wash. It was thought that the one surface which had been buried might contain relict economic pollen. Unfortunately, this procedure yielded essentially modern pollen of juniper, pine, snakeweed, and grass. This result suggests that (1) the buried side was not the use surface or (2) water flowing under the metate washed away the prehistoric pollen. In any event, the types of vegetal resources used by the site inhabitants remain a mystery.

CHAPTER V

SITE LA 25466

General

Site LA 25466 is located atop a low bench on the east side of the Rio Puerco, about 0.8 miles (1.3 km) from its confluence with the Rio Chama. The canyon is rather steep and rugged in the vicinity of the site, excepting for the gently sloping bench (Fig. 27). The bench has a few scattered juniper trees, but is primarily covered by grasses, rabbitbrush, snakeweed, wolfberry, and sagebrush. Tamarisk grows near the streambed.

The site consists of a surface scatter of chipped stone, ceramics, and Euro-American artifacts, a log corral and associated structure, the foundation of an outbuilding, and the masonry and adobe remains of a habitation structure. The site was recorded in 1975 by the School of American Research, and was subjected to limited test excavations in 1979 by that institution. The testing program in 1979 consisted of placing a one meter square atop an existing pothole in the southeast portion of Feature A, the habitation structure. This test hole encountered a hearth, and resulted in the collection of a pollen column and some dendrochronological specimens. Pot holes were noted along the west wall of Feature B, and in Feature C, but were not investigated. It was also noted that at least a portion of the site had been previously inundated.

Feature designations were made at the time of initial recording, prior to subsurface investigations. Feature A refers to the apparent house foundation, Feature B refers to an outbuilding, Feature C designates a concentration of stone rubble just southeast of Feature A, and Features D and E refer to the corral area. Rather late in our field investigations it was discovered that Features A and C were actually continuous, forming an "L" shaped habitation structure. To retain consistency and continuity between our field records and this report, the feature designations will remain unchanged. Feature A refers to two westerly rooms, and Feature C refers to two adjacent easterly rooms.

Field Methods

As specified by the scope-of-work, the tasks to be conducted at this site were as follows:

1) Prepare a site map; and

2) Make sufficient surface collections, test excavations, and controlled excavations to define the function of each structure, feature, and intrasite activity area.

The data recovery techniques employed were oriented to these ends. Initial tasks consisted of mapping visible features and the systematic collection of all surface artifacts. All surface artifacts were marked by pin flags and were mapped, using a 50 m tape and a compass. A rebar datum established by earlier investigation of the site by Nickens and Associates

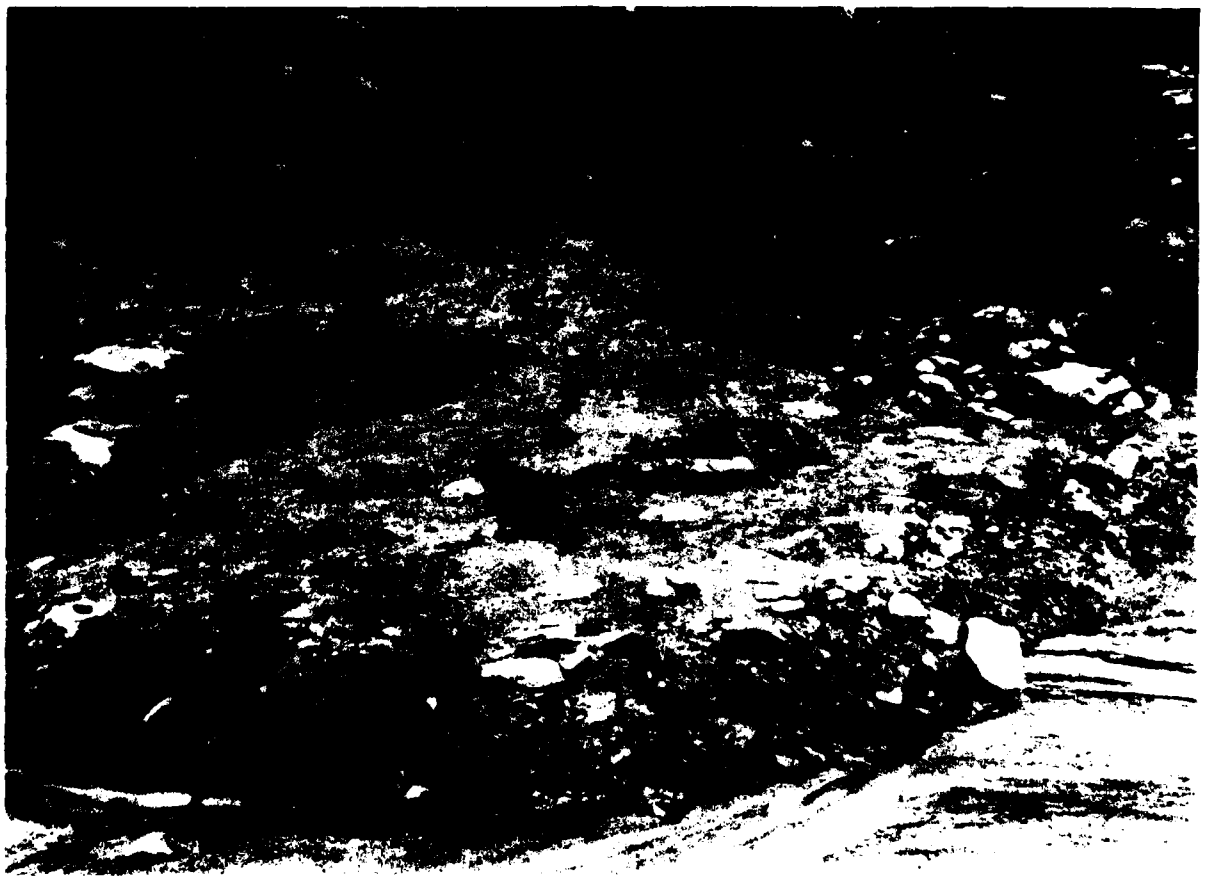


Figure 27. Photo showing LA25466 and its location on a bench along the Rio Puerco.

was used as a reference point. Surface artifacts were then collected, and were sequentially numbered to preserve provenience information. Locations of key structural elements and planned excavation units were then mapped.

Subsurface investigations were designed to assess the nature of subsurface cultural fill, to recover desired artifacts and ecofacts, and to determine the age and function of the historic structures. To these ends, nine one meter squares were delineated at non-random locations across the site, outside of the structures. They were located where the potential for yielding significant data seemed greatest, yet, as Figure 28 illustrates, were scattered across the site. Some were designated in areas of lithic artifact concentration, to discern the nature of the presumably aboriginal archaeological component. Others were located to discern the extent of architectural features. Four excavation units were situated atop a small erosional feature, where charcoal and artifacts were concentrated. Earlier investigators suggested that this area, located between the habitation structure and an outbuilding (Feature B), was probably a trash dump. The 1 m by 1 m test units were excavated in 10 cm vertical increments. All fill was screened through 1/4 inch mesh. Excavation proceeded to either bedrock or a level clearly beneath cultural deposits.

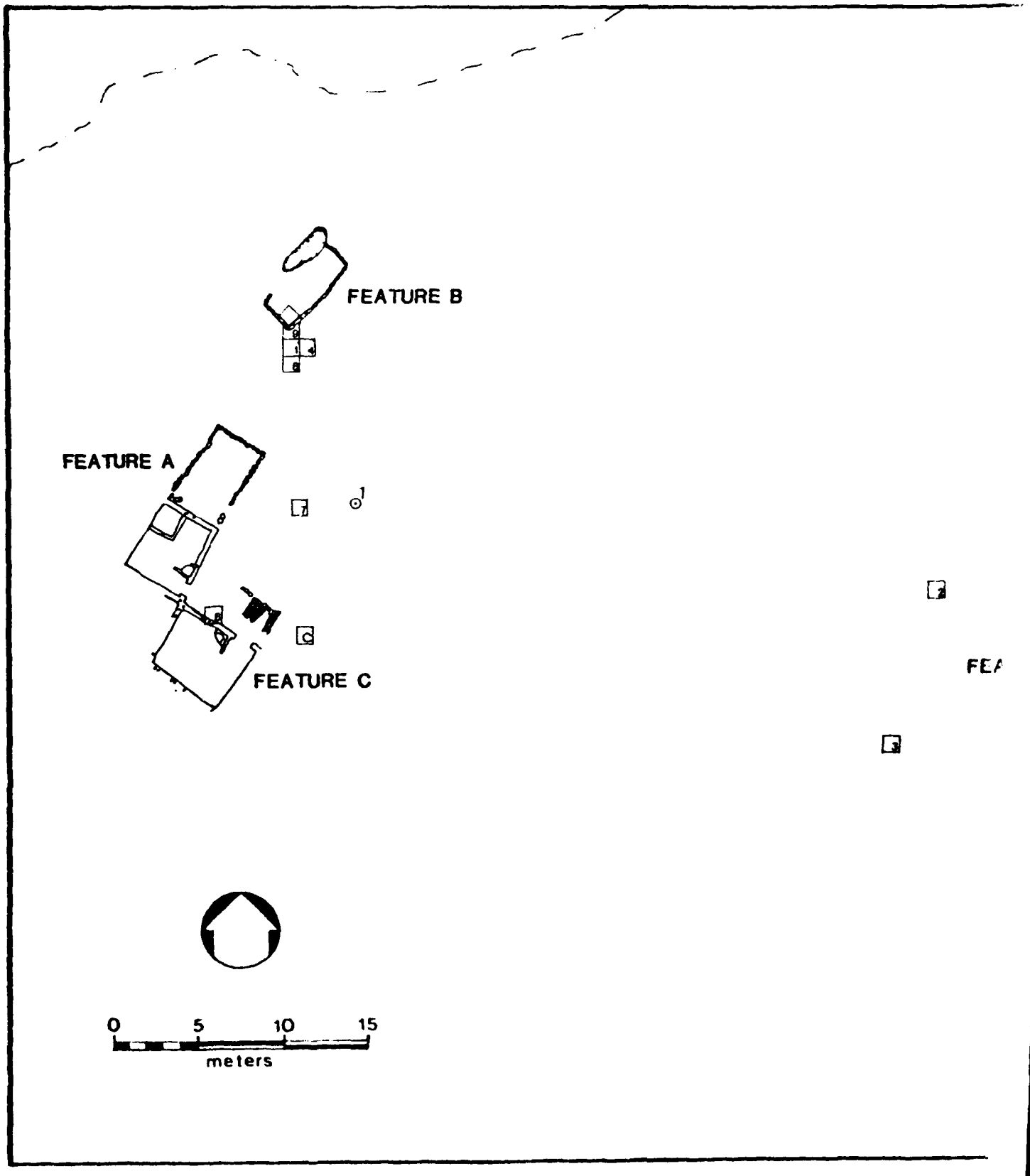
The interiors of the historic structures were generally investigated in a somewhat different manner. A single one meter square excavation unit was situated in the southeast corner of Feature B, in one of the few areas apparently untouched by vandals in this structure. The unit was excavated in 10 cm arbitrary levels and all fill was screened. Feature A was gridded into a number of one meter squares, which referenced a temporary datum near the center of the north wall. The grid was oriented parallel to the masonry walls of Feature A, rather than to true north. Grid square designations were made in a manner reflecting the location of the northwest corner of the square in relation to the temporary datum, assuming that the structure was oriented with the cardinal directions. Grid square designations, then, included items such as 5S, 1E, which would be a point five meters south of the temporary datum, and one meter easterly (at right angles).

Initial test units were excavated in 10 cm vertical increments. It was soon determined, however, that culturally meaningful strata were not present in the fill above the structure's floor, so the fill was removed as a single unit. All excavated fill was passed through 1/4 inch mesh. Ancillary study specimens, such as beams for tree-ring analysis, were liberally collected. Features encountered were photographed, and plan views and profiles were prepared. Upon completion of the excavations, all units were backfilled.

Cultural Features and Stratigraphy

Features A and C

Features A and C represent a single structure. As mentioned above, the separate designations were made on the basis of surface manifestations, which evidenced no continuity. Prior to excavation, the structure


FEATURE B
FEATURE A
FEATURE C
FEA
0
5
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15
meters

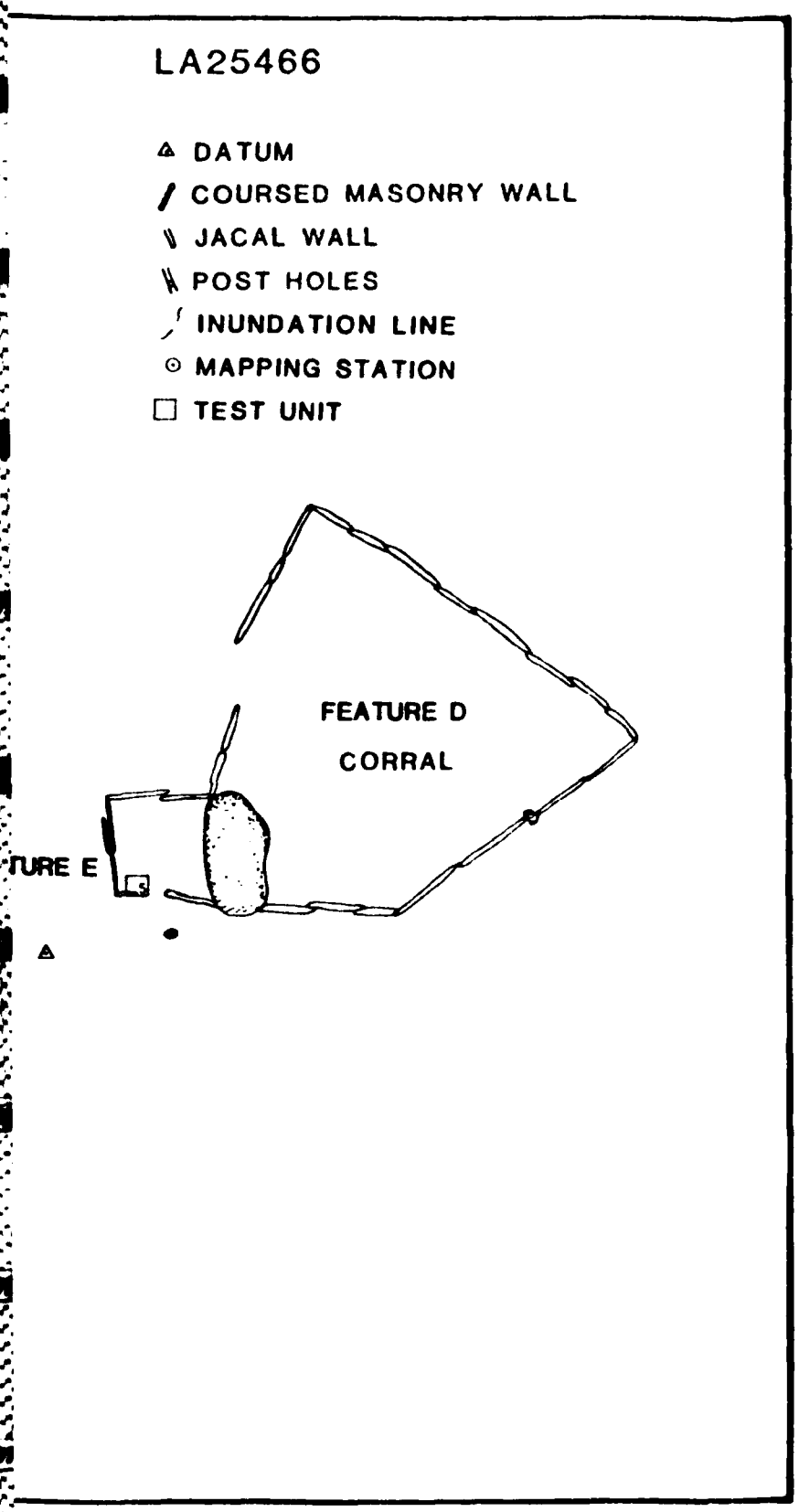


Figure 28. Plan view of LA 25466 showing location of test units in relation to features.

was represented by three low walls, comprising Feature A, and the remains of a fallen rock wall, Feature C, located some distance to the southeast. Subsequent investigation proved that many of the walls of the structure were made of adobe rather than stone, which had, due to natural weathering and perhaps previous inundation, "melted" away. The structure was ultimately determined to possess four rooms, two of which were assigned to each feature designation. As shown in Figure 29, the structure is "L" shaped.

Feature A, North Room:

The north room of Feature A is bounded on the northern, eastern and western side by masonry walls, and on the south by an adobe wall. The three masonry walls are built of unmodified sandstone blocks. They are generally simple, with most blocks facing the interior and the exterior. In some places, two blocks span the walls' width. Mortar is not visible, evidently having eroded away. At the time of excavation the walls were rather low, being no more than three courses high averaging 20 to 30 cm in height. As illustrated in Figure 30 and supported by excavations, wall rubble is not plentiful, suggesting that the masonry walls served as a foundation for adobe bricks. No definite doorways are evident in the room walls, although there is an apparent gap in the southern portion of the eastern wall. A door sill is absent. The room measures approximately 5.0 m north to south and 3.2 m east to west.

Eight one meter square excavation units were excavated in the north room of Feature A. In addition, a trench approximately 20 cm wide was dug along the wall interior, down to floor level, in grid squares not otherwise investigated. A poorly defined floor was revealed approximately 20 cm below the present ground surface. The floor was poorly packed, and yielded few artifacts. It was covered by a sandy soil, possibly representing windblown deposits. The fill was quite homogenous, consisting of a dark yellowish brown (10 YR 4/4) soil with no beams, adobe or plaster. Artifacts, including chipped stone and charcoal flecks were scattered throughout the fill. Excavation in grid square 050E, along the north wall, continued through the floor surface down to 50 cm below the present ground surface. The 30 cm below the floor level consisted of a very compact loam, lacking artifacts and charcoal and other evidence of cultural deposition. The non-cultural soil is brown in color (7.5 YR 4/2). Two horizontal slabs were placed at approximate floor level in the southwest corner of the room. The function of the slabs is unknown. No other floor features were discovered in the room.

Feature A, South Room:

The south room of Feature A is entirely enclosed by adobe walls. The room was virtually invisible prior to excavation, except for a few stubs of posts emanating from buried intact adobe walls. The western wall and the western end of the southern wall are almost entirely eroded away. These areas are on the downslope portion of the site, and the floor level is immediately below the sod. Consequently, the interior portion of the wall is discernible, but the exterior portion has been destroyed. The room's northern, eastern and the intact portion of the south wall are similar in construction technique. The walls average 28

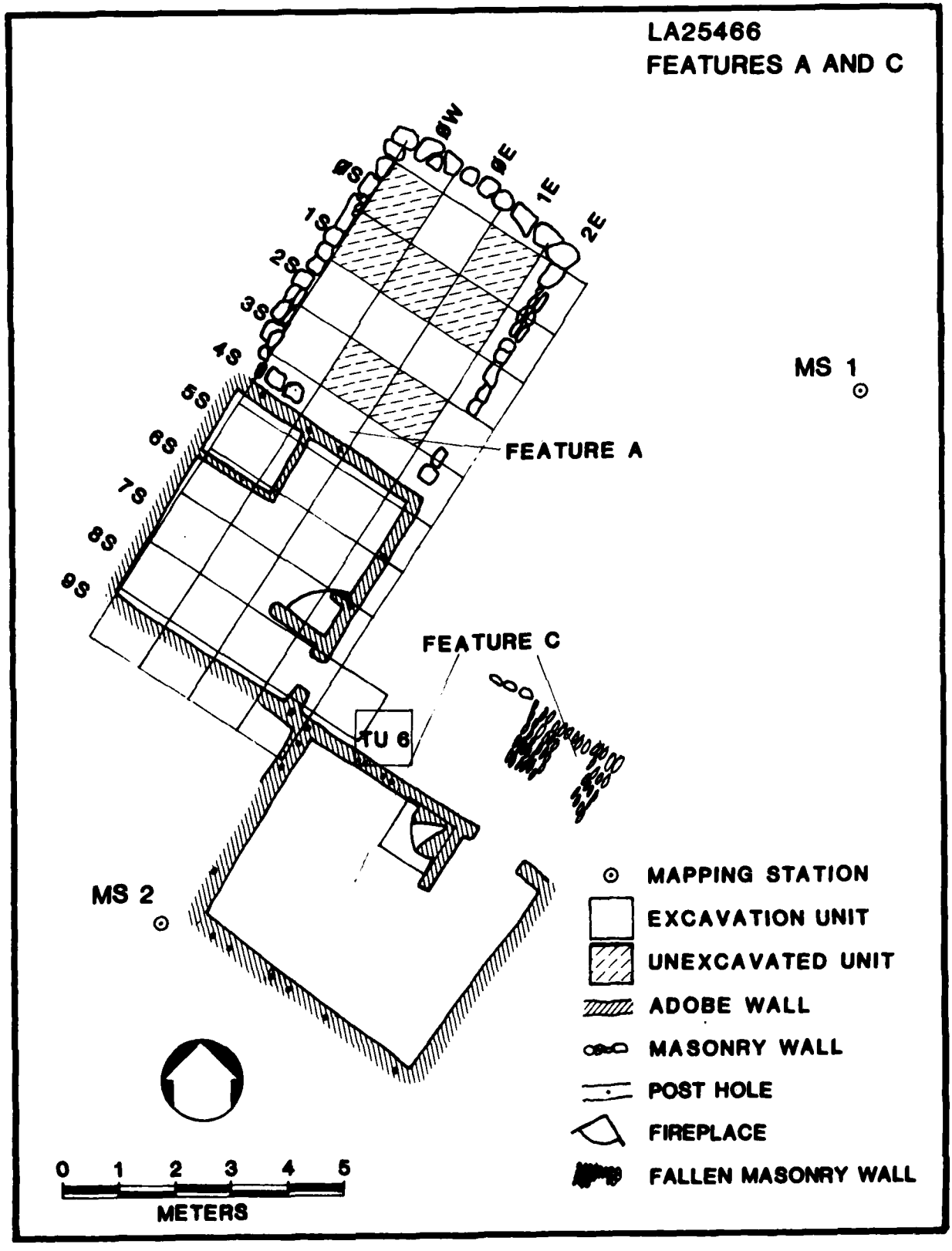


Figure 29. Plan view of Features A and C, showing location of excavated grid squares and room features.

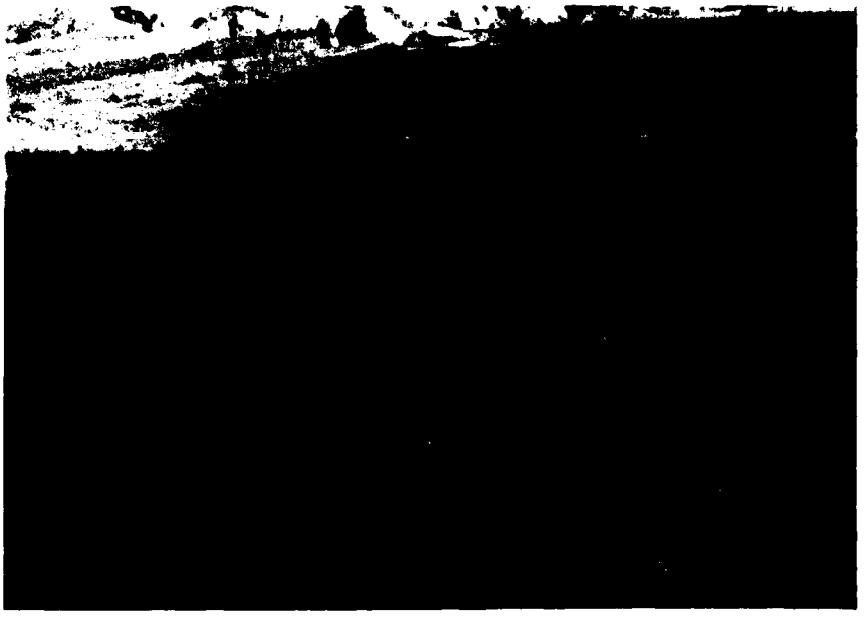


Figure 30. Photo of the north room of Feature A, prior to excavation.

to 30 cm in thickness. A few juniper posts extend from the wall. The adobe is very hard and is dark brown in color (7.5 YR 4/2). No rocks are incorporated into the adobe. In places, adhering to the adobe, is strong brown plaster (7.5 YR 4/6), which appears to be approximately the color of the silts in the Rio Puerco. At some locations, adhering to the interior wall surface, is a stark white plaster. During occupation, the white plaster evidently covered all of the interior walls. A single doorway is evident in the south room of Feature A, opening from the southeastern portion of the room into the northern room of Feature C. The doorway is in the southern-most portion of the west wall, approximately 45 cm from the southeastern corner. At the bottom of the doorway is a sandstone sill, over which, set into the walls at either side, is a horizontal wooden beam. The top of the beam is level with the raised floor onto which the door opens - a difference of approximately 15 cm.

The level of the floor is at varying depth below the present ground surface, ranging from approximately 5 cm in the southwestern corner to approximately 20 cm in the eastern portion of the room. The fill above the floor consists of numerous unburned juniper beams, strong brown adobe, often with adhering stark white plaster, lithic, ceramic, glass and metal artifacts, in a matrix of brown clayey soil. Wooden beams are particularly abundant near the center of the room. The floor is strong brown or dark brown in color, and appears to have been resurfaced several times. The well-prepared floor was easy to trace. Floor artifacts were surprisingly rare, however.

Two features are present within the room. The northwest corner of the room is partitioned off by two narrow adobe walls. The two walls of the feature are similar to the rooms exterior walls in color and construction, but average only 12 or 13 cm wide. They extend from the floor upward to the overlying sod, without an apparent doorway. The feature is illustrated in Figures 31 and 29; the photograph shows that one of the walls was inadvertently damaged during excavation. The area enclosed by the feature measures 1.6 m by 1.1 m. No unique artifacts or other materials were observed within the enclosed area.

A firehearth is located in the southeastern portion of the room, near the doorway described above (Fig. 32). This firehearth had been previously disturbed; a pothole was situated atop of it, which was slightly expanded by archaeologists affiliated with the School of American Research. It is likely that this hearth closely resembled the hearth encountered in the south room of Feature C, described below. The hearth is situated in a corner; one side rests against the east wall, and another side incorporates a small wall extending at right angles from the eastern wall. This secondary wall is 16 cm thick and 1.2 m long. This wall extends upward into the sod. The hearth is raised approximately 10 to 15 cm above the floor level at the front. The front of the hearth is semicircular in shape. Oxidized sandstone slaps are horizontally placed onto the floor of the hearth. As is typical with Hispanic corner hearths, the front of the hearth was evidently partially enclosed by a bifurcated cone. Portions of the vertical walls that extend from the side walls along the front of the hearth to the opening in the fireplace were intact. A plan view and profile of the hearth is presented in Figure 33.

Figure 31. Photo of the south room of Feature A upon excavation. The south room is first beyond the north arrow. The walls partitioning off the northwest corner of the room are on the right.

Figure 32. Photo of a hearth in the south room of Feature A.

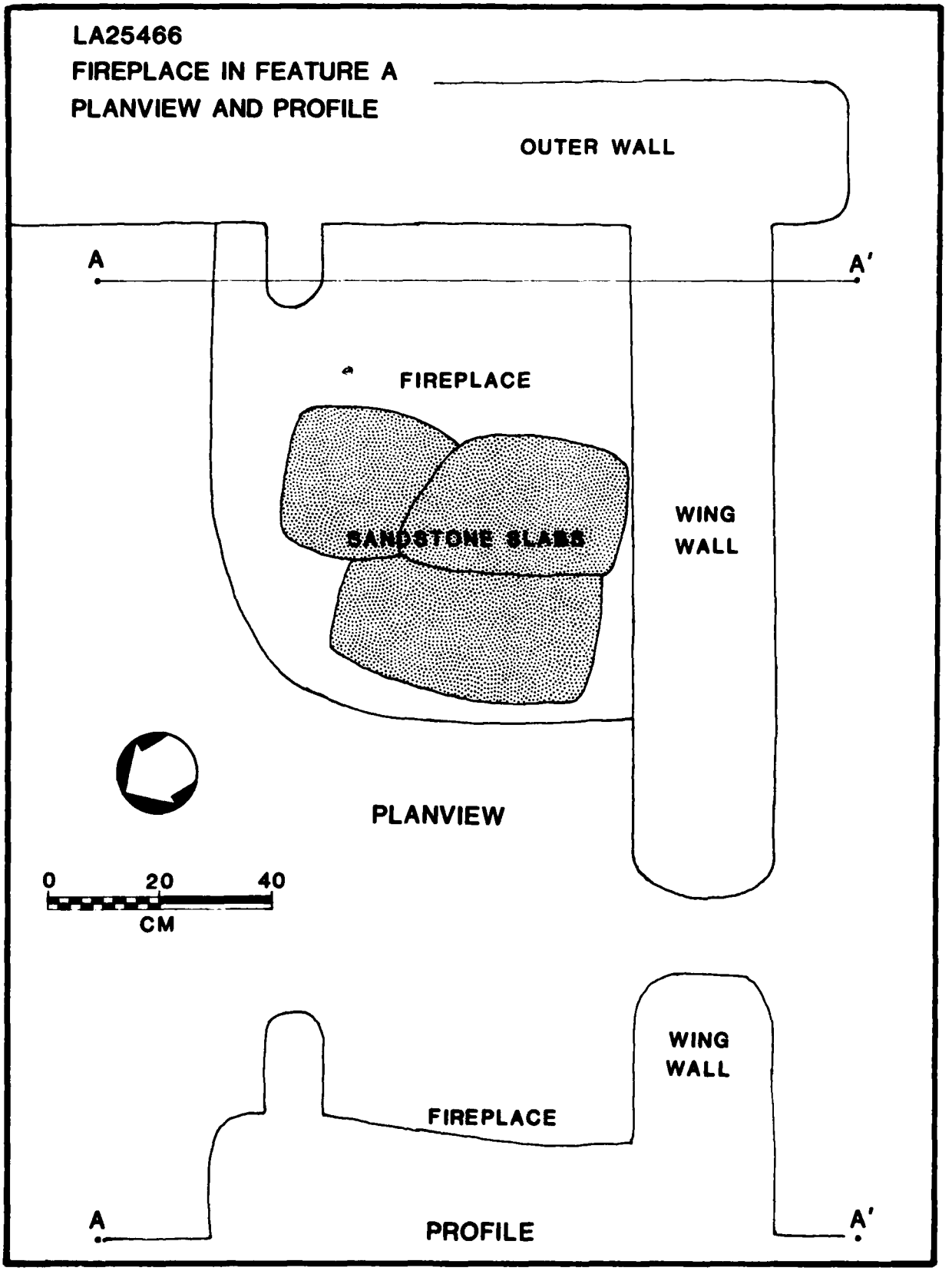


Figure 33. Plan view and profile of the hearth found in the south room of Feature A.

Feature C, North Room:

This room is located eastward of the south room of Feature A; indeed, the two rooms share a doorway. The eastern wall of the north room of Feature C is masonry. The wall has fallen as a unit, leaving easily discerned from the present ground surface the configuration and coursing of the wall (Fig. 34). A large pothole, measuring 1.4 m by 0.89 m and 1.0 m deep, is present in the center of the fallen wall. The placement of the pothole and the large size of some of the sandstone blocks in the eastern portion of the wall indicated that the feature's interior was eastward of the room's actual location. Consequently, initial testing of Feature C occurred outside of the room, as shown in Figure 28.

The north wall of the room may also have been masonry. A 1 m long section of the wall can be traced from the northeast corner of the room. This section is only two courses high. No evidence of the western portion of the northern wall could be found, so it is unknown if the wall was continuous. The south and west walls of the room are adobe. White plaster still adheres to portions of the south wall.

The interior of this room was investigated via the excavation of two one-meter squares and informal trenches to trace wall alignments. The two excavation units, Test Unit 6 and one in the southwest corner of the room, encountered a dirt floor between 27 and 30 cm below the present ground surface. No internal features were discovered. The fill in these units consisted of compact brown loam, with plaster and other construction materials in the lower levels. No beams suitable for tree-ring studies were discovered. The room measures 2.5 m north to south and 3.6 m east to west.

Feature C, South Room:

The south room of Feature C measures 3.7 m along the east wall and 4.6 m along the south wall. The walls are all adobe, approximately 30 cm wide. The southwestern portion of the room is very shallow, causing erosion of the adobe walls. The interior of the walls were easily definable, however, due to the presence of a white plaster surface (Fig. 35). The floor is approximately 23 cm below the present ground surface in the northeastern corner. The dirt floor is 3 cm higher than the floor level in the north room of Feature C, and 18 cm higher than that in the south room of Feature A. While removing the sod and defining the walls, a doorway was discovered in the northeastern corner of the room. The doorway is 1 m wide and is situated in the north wall. The doorway appears to open outdoors, just outside of the north room of Feature C. A firehearth was located and excavated along the north wall. The construction details of the hearth are quite similar to those of the firehearth in the south room of Feature A. Apparent differences are probably due to the fact that the hearth in Feature A had been vandalized, and then investigated twice by archaeologists. The hearth in Feature C is located near a doorway along a major adobe wall. A short wing-wall, approximately 1 m long and not as wide as exterior walls, emanates at a right angle from the north wall. This forms a corner into which the hearth is situated. The base of the hearth is approximately 10 cm above

Figure 34. Photograph of the fallen east wall of the north room of Feature C.

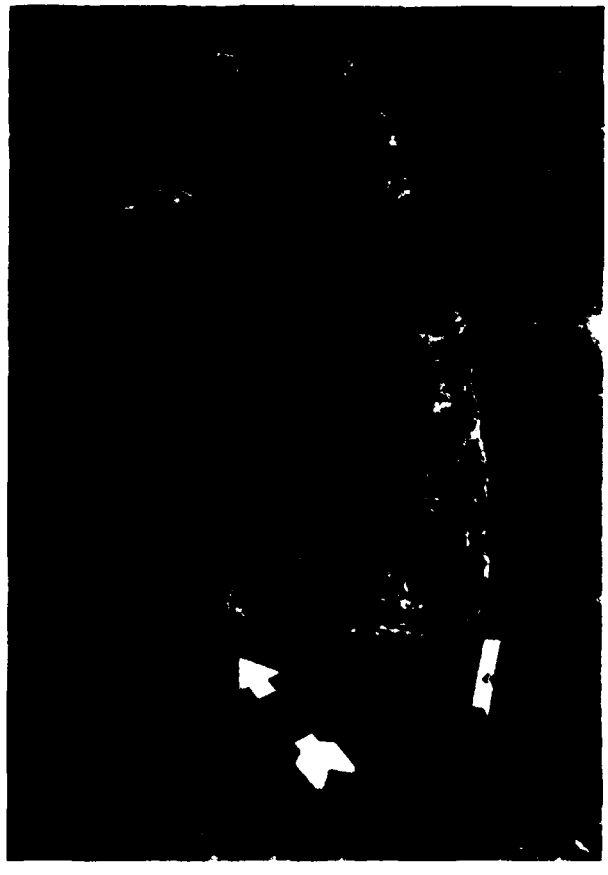


Figure 35. Photo showing wall alignments discerned by removal of sod.

the floor level, and is rather level. The base is semi-circular, extending approximately 70 cm outward along the two walls, and 80 cm outward at the hearth's center. The hearth area proper is triangular in shape, as shown in Figures 36 and 37. The excavation unit around the hearth was the only substantial test in this room.

Trash Area

Test Units 1, 4, 8 and 9 were contiguous, and were situated in an artifact and charcoal concentration. Earlier investigators posited that this area served as a trash dump, and our work supported this hypothesis. Configuration of strata (Fig. 38) indicate that trash was deposited in a depression such as a natural drainage. Charcoal is plentiful in the trash, suggesting that some of the trash was either placed in the depression and burned or burned in a firehearth elsewhere on the site and then dumped into the depression. A large number of artifacts and ecofacts were found in the trash area. Artifacts include historic ceramics, buttons, shoe fragments, sewing chalk and metal, and lithic materials; ecofacts include peach pits and carbonized corncobs. Charcoal and artifacts extend to approximately 55 cm below the present ground level. The cultural stratum is composed of various micro-lenses, suggesting repeated use and depositional events. While the color is variable according to levels of charcoal staining, it tends towards grayish brown in color (10 YR 5/2). Beneath the cultural stratum is a compact, brown to dark brown soil (7.5 YR 4/4). Excavation proceeded to as deep as 70 cm below the present ground surface.

Feature B

A single centiare (one square meter unit) was excavated in the southeastern corner of Feature B, an outbuilding. The structure is abutted against a large sandstone boulder on the west; the remainder of the structure is defined by low masonry walls of unmodified sandstone blocks (Fig. 39). Whether the masonry walls represent a foundation for adobe bricks or represent the remnants of stone masonry walls is uncertain, but the dearth of rubble would argue against the latter explanation. The trash level exposed in Test Unit 9, outside and adjacent to Feature B, continues beneath the southern wall, indicating that the structure was built after considerable trash dumping had occurred. The trash beneath the wall is approximately 10 cm thick, and is situated on a compact, non-cultural brown soil. The fill in Feature B consists primarily of a less compact soil yielding charcoal, ash, adobe, and artifacts. The cultural fill is grayish brown in color (10 YR 5/1 and 10 YR 5/3). A sloping, slightly undulating floor surface is present between 35 and 40 cm below the present ground surface. The floor is poorly compacted, sandy, and brown in color (10 YR 5/3). The floor is approximately at the same level as the base of the masonry walls. No other features were discovered in the excavation unit.

Other Excavation Units

Test Unit 2: This excavation unit was defined and dug in order to generate data on the site's lithic component. The unit was situated in a concentration of lithic artifacts. The test unit was excavated to bed-

Figure 36. Photo of the hearth found in the south room of Feature C.

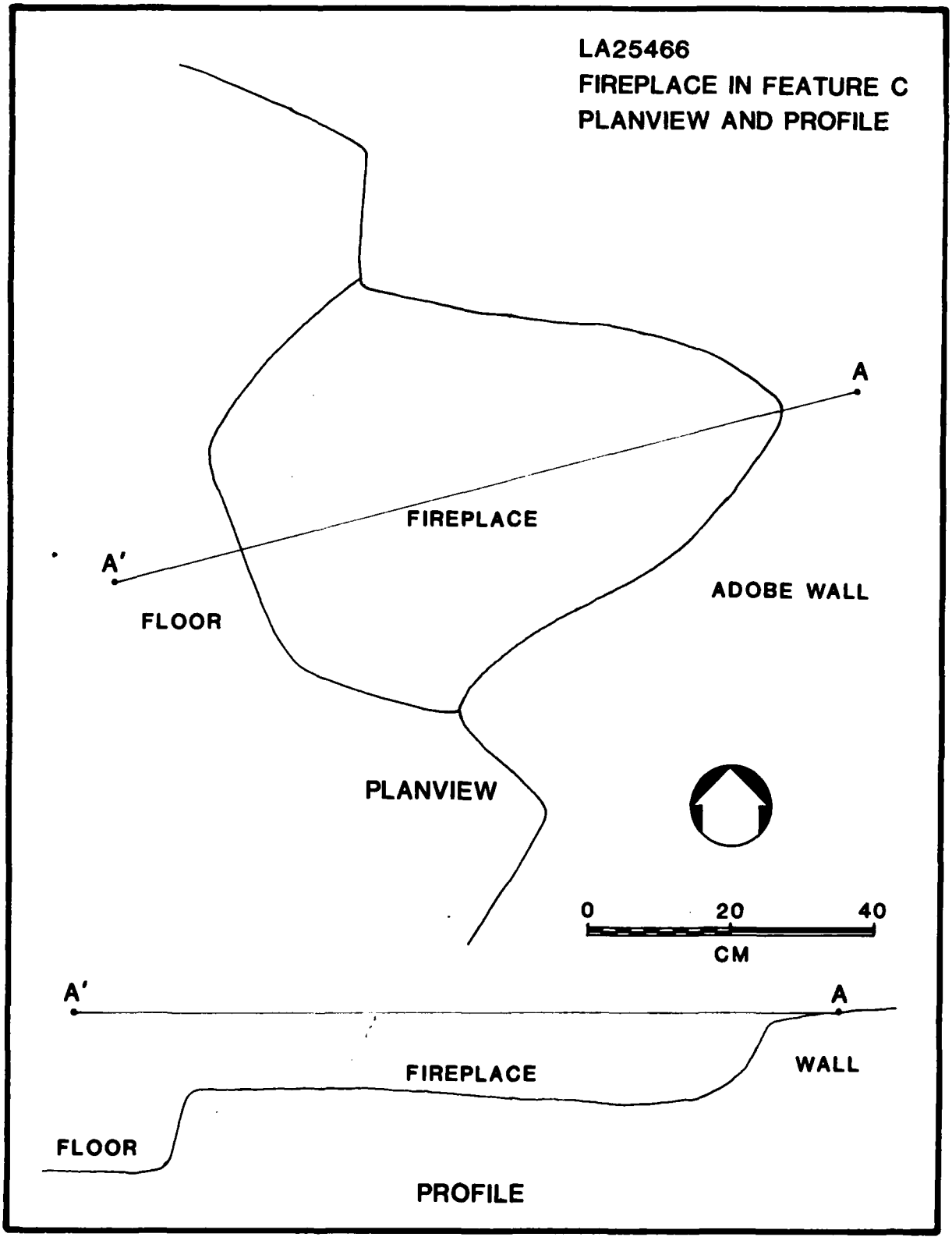


Figure 37. Plan and profile of the hearth discerned in the south room of Feature C.

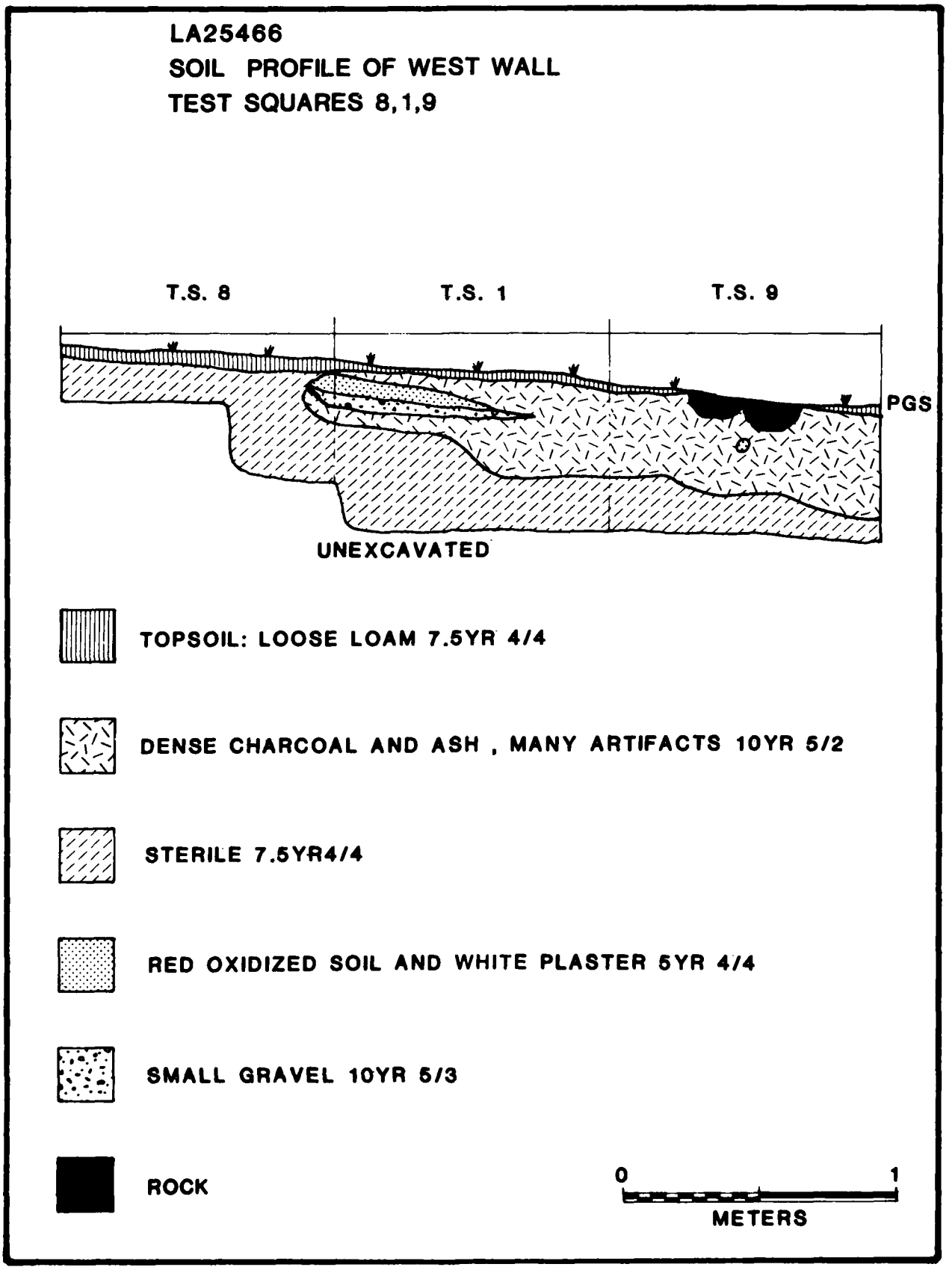


Figure 38. Profile of the stratigraphy encountered during excavation of the trash area.

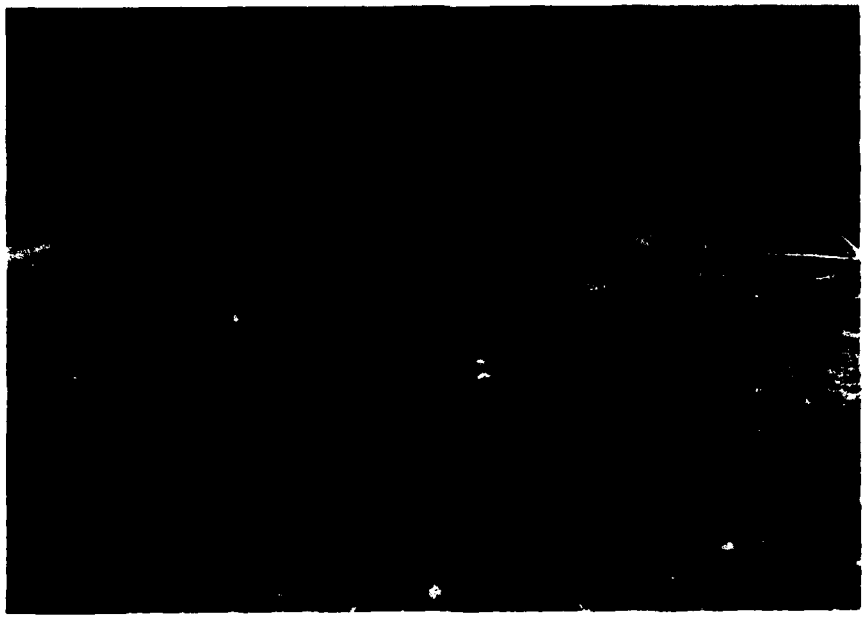


Figure 39. Photograph of Feature B.

rock, encountered at 42 cm below the present ground surface. Twenty-eight flakes were recovered in the test unit, from all excavation levels. Soils were brown in color and compact, but were void of charcoal. The degree of compactness varied somewhat vertically, but color and artifact distribution similarities indicated that only a single component is represented. Depth of cultural materials is probably due to vagaries of soil deposition.

Test Unit 3: This unit was also designated to test the lithic component. The unit was excavated to bedrock, 30 cm below the present ground surface. A small number of flakes were found in Levels 2 and 3. Soil was homogenous.

Test Unit 5: The purpose for digging this unit was to provide subsurface data for Feature E, a structure adjacent to the corral. As Figure 40 illustrates, Feature E consists of a timber superstructure, abutted against a large boulder. A doorway still stands in the southern wall, consisting of two vertical posts and a suspended beam. The west and north walls are collapsed, but are definable by properly oriented timbers. The sandstone boulder forms the east wall. The interior of the structure is relatively free of timber, making it questionable whether the structure was roofed. It is possible, however, that roofing material was smaller in size than the large timbers forming the walls, making it suitable for use as firewood by later visitors to the site, or more vulnerable to decomposition.

Test Unit 5 was excavated to a depth of 30 cm. No artifacts, charcoal, or living surfaces were encountered in the light brown sandy soil.

Test Unit 6: This unit was excavated before the relationship of Feature C to Feature A was realized. It was situated in what proved to be the north room of Feature C. The unit encountered an adobe wall and a dirt floor surface, which are described above.

Test Unit 7: This test unit was located east of the north room of Feature A in order to determine the nature of extramural stratigraphy and artifact distributions. The uppermost 10 cm consisted of light brown sandy soil, in which a single artifact was found. The next 10 cm vertical level encountered a very compact clayey soil, devoid of artifacts. This level was similar to non-cultural soil encountered elsewhere on the site, so excavation terminated at 20 cm below present ground surface.

Test Unit C: This unit was investigated early in our investigations, in order to determine the nature and extent of Feature C. This and subsequent excavations demonstrated that the test unit was located outside of the occupation area. A cultural stratum extended from the present ground surface down to between 8 and 10 cm below the present ground surface. It contained a few flecks of charcoal and two sherds. Below the cultural level was a brown, compact non-cultural clayey soil. Excavation terminated at 20 cm.

Corral

A standing corral, Feature D, is located at the eastern portion of

Figure 40. Photograph of Feature E, located adjacent to the corral. Note the standing door frame.

the site, near the base of the talus slope. The corral is largely standing, as shown in Figure 41, and measures approximately 18 m by 19 m. A large sandstone boulder is incorporated into the southwest corner of the corral. Feature E also makes use of this boulder; the two features propinquity implies related function. The corral is built of large logs, some of which are up to 8 m in length and 35 cm in diameter. The size of the logs suggests that they are cottonwood. The logs were once evidently four courses high around the entire perimeter, approximately 1.3 m above the present ground surface. The logs are axe-cut. Where logs intersect they are notched and joined by a short log set at right angles (Fig. 42). An opening in the western wall suggests the location of a gate. Living juniper trees are included in some portions of the wall. No excavation units were placed in the corral.

Dating

Construction of a chronological framework for LA 25466 is based on obsidian hydration and artifact cross-dating. Dendrochronological specimens, obtained from the habitation structure, were also collected, but the juniper specimens failed to yield any chronometric dates.

Five obsidian artifacts were submitted to the Branch of Isotope Geology at the U.S. Geological Survey for hydration analysis. The artifacts are thought to be part of the lithic assemblage found on the site, and therefore contemporaneous. It was anticipated that the lithics predated the Hispanic occupation of the site. The results of the hydration analysis, however, suggests otherwise. As shown below in Table 15, four of the six dates obtained form the five artifacts are less than 175 years old. Assuming that the hydration rate may have been slightly accelerated by shallow burial, it is feasible that the samples were flaked during the span of Hispanic occupation. It is also possible that the lithics were chipped and deposited a few decades before the Hispanic settlement. Another sample yielded a date of 3000 years B.P. The remaining date obtained is approximately 200,000 B.P., which probably dates a natural fracture rather than one man-made. Application of Schaafsma's (1979) hydration adjustment factor would not substantially alter the above interpretations so is not considered.

TABLE 15

RESULTS OF OBSIDIAN HYDRATION ANALYSIS
LA 25466

F.S. No.	Provenience	Refractive Index	Hydration $(mm)^2$	Hydration Rate at 12.6° C $(mm)^2/10^3$ years	Hydration Age Years B.P.
19	Test Unit 1, Lev. 4	1.482	nil	8.4	- 100
27	Test Unit 1, Lev. 5	1.483	0.9	6.7	12.5
177	Surface #102	1.483	nil	6.7	- 125
141	Feature A, fill	1.483	20.0	6.7	3000
173	Feature C, fill	1.483	1.1	6.7	175
173	Feature C, fill	1.483	1350.0	6.7	200,000

Figure 41. Photograph of the corral at LA25466.

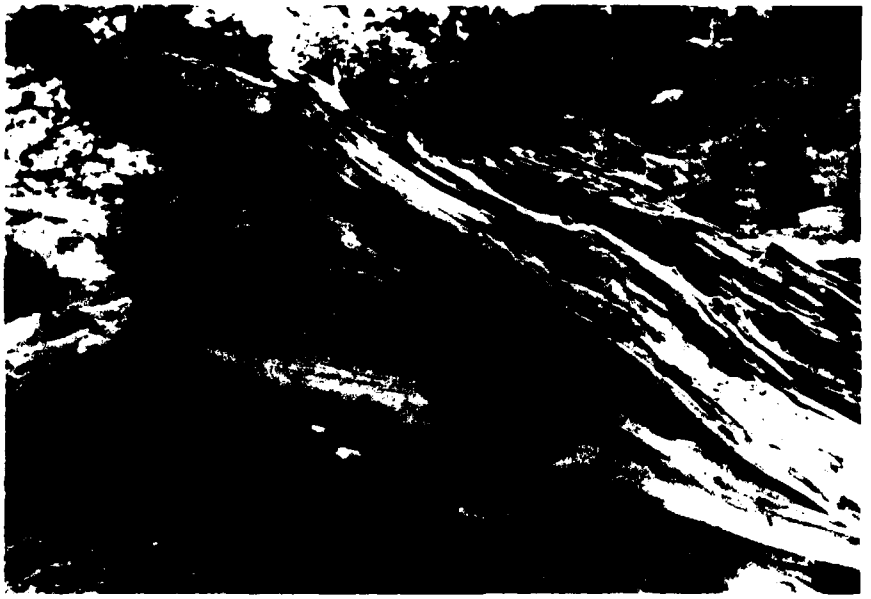


Figure 42. Photograph showing construction details of the corral at LA25466.

Certain artifact types may be used to date the site. Aboriginal ceramic typologies provide some temporal indication: presence of Tewa Red-on-buff and Tewa Black indicate that the site was occupied between the late seventeenth century and the early twentieth century. Mass-produced, Euro-American artifacts are more exact temporal indicators, however, due to thorough historical literature documenting stylistic and technological evolution. Analysis of the site's Euro-American artifacts, particularly of ceramic hallmarks, glass ware and firearm cartridges suggests that the Hispanic occupation dates between A.D. 1890 and 1915. This is in line with the culture history of the Piedra Lumbre Valley and falls within the expected span suggested by previous investigators.

Material Culture

The discussion of the artifacts recovered during the investigation of LA 25466 is divided into two sections. The section on the Euro-American Artifacts was written by an expert on historic archaeology, Dr. Douglas D. Scott of Montrose, Colorado. The section on lithic artifacts was prepared by the senior author.

An Analysis of Euro-American Artifacts from LA 25466

The 199 artifacts of Euro-American origin and manufacture from LA 25466 represent a meager and poorly preserved selection of the material goods utilized by the inhabitants of the structure and its associated features. The artifacts are pieces of larger objects but most of them are small and badly broken, desiccated, or oxidized. Their condition makes interpretation and, in some cases, identification difficult.

The following descriptions are divided into classes of artifacts based on the primary manufacturing material. The descriptions of the artifacts in the various classes is based on a functional identification of the item.

Metal

Most of the metal items are made of iron, although there are items of copper, brass, and zinc. The iron is heavily oxidized and, in some cases, has been oxidized beyond recognition.

Nails - Five fragments of wire nails are represented in the collection, but are so heavily oxidized that sizing them is impossible.

Railroad Spike - One example of a common railroad spike was found.

Tin Cans - Ten fragments of sides, tops and bases of tin cans but the fragments of tops and sides were not large enough to size or determine if the cans were hole-in-top variety or sanitary cans.

Square Can - There are 10 fragments of a square or rectangular can. One fragment is from a top and has a portion of a circular opening represented which was sealed with a press-on lid. The can may be some type of condiment can for something like baking powder.

Wagon Part - One large iron fragment is from the yoke of a wagon tongue. The fragment is 6" long, 3/4" thick and 2-1/2" wide and has portions of two holes for carriage bolts near each end. The most intact hole has become elliptical through wear.

Wire - Five pieces of common fence wire are present in the artifact collection.

Buttons - There are 4 iron and brass composite rivet style buttons which are 5/8" in diameter; they are of the style commonly found on overalls.

Unidentified Iron Fragments - Nineteen iron fragments are so heavily oxidized that they cannot be identified.

Zinc Plate - There are 4 fragments of a thin corrugated sheet plated with zinc which may be from a washboard although the identification is speculative. There is also one piece of a strip of plated zinc that has been folded over on itself several times. The piece is 3/8" wide and about 1/16" thick. A functional identification has not been made.

Copper Rivets - There are three 3/8" copper rivets present in the collection.

Cartridge Cases - There are two spent cartridge cases in the collection. One is headstamped 44 WCF WRACO (Fig. 43c) (F.S. 142). This is a .44-40 cartridge manufactured by Winchester Repeating Arms Company. The cartridge was first introduced in 1873 and is still made today, although Winchester changed its trademark in the second quarter of the twentieth century (Logan 1959:137). The second cartridge (F.S. 15) is headstamped 44 SW AM WRACO (Fig 43d). This cartridge is for the .44 Smith and Wesson American pistol first introduced in 1871. The cartridge was not manufactured after 1940 (Logan 1959:136; Barnes 1969:167).

Glass - The 39 fragments of glass and 3 white glass buttons comprise the glass assemblage from the site. Except for the three buttons the rest of the assemblage appears to be from glass bottles. The fragments are very small, usually no larger than 2 square inches. No identifying marks were found on any pieces although one neck and finish is present.

The following lists the number and type of glass present by color:

Color	Base	Body	Shoulder & Neck	Finish
Amber		2		
Aqua	1	14	1	
Brown	1	6		
Clear	4	8	1	1

The aqua body fragments are all flat and range in thickness from 1/16" to 1/8" suggesting that at least one panel bottle is present. However, the range of thickness is not outside the range of variability for window panes.

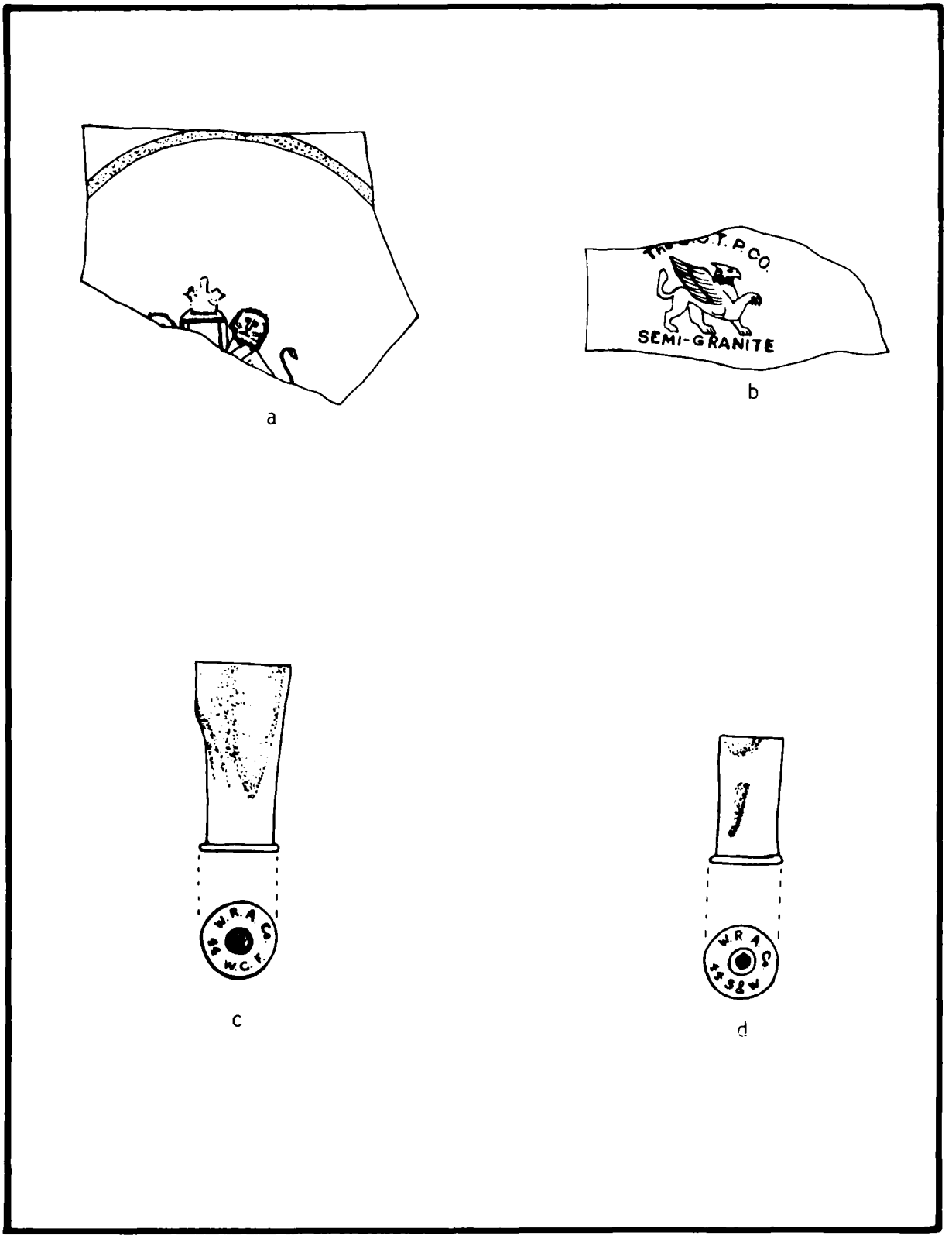


Figure 43. Illustration of diagnostic ceramic and metal artifacts recovered at LA25466.

The aqua base fragment is from the corner of a square or rectangular panel bottle.

The only relatively datable glass fragment is the clear glass neck, shoulder, and applied finish fragment. The bottle appears to have been a clear prescription oval with an applied patent lip and a mould seam that stops on the neck, indicating the bottle was made on a semi-automatic bottle machine. Semi-automatic bottle making machinery was in vogue from 1880-1913 (Newman 1970:70-75). The colors of some of the glass fragments also suggest a broad date range for the artifacts. Aqua glass was common from 1880 to about 1920 and amber glass has a date range from about 1873 to the present (Gillio, Levine and Scott 1980:18).

The three white glass buttons are concave on one side and convex on the other. Two are four-hole varieties; one is 3/8" diameter or 16 lines and the other is 7/16 or 18 lines. The third button is a two-hole variety and is 5/16" in diameter or 14 lines (Gillio, Levine and Scott 1980:21). White glass buttons are common after 1830 and are still being manufactured today (Luscomb 1967).

Ceramics

Except for one piece the entire ceramic assemblage is comprised of white hardpaste earthenwares, commonly known as ironstone. Of the ironstone fragments three have portions of base marks, and three are decorated while one non-ironstone fragment is made of porcelain and appears to be the base of a crudely made statue (F.S. 105).

The decorated items are: one fragment of a brown transferware ironstone plate, one fragment of a hand painted overglazed cup rim (the exterior has a red line immediately below the rim and the interior is painted blue in a floral pattern), the third decorated fragment is also a hand painted overglazed fragment probably from a cup (the decoration is on the exterior and is a floral design with green leaves, a blue flower and a red stem). The undecorated specimens include:

30 undifferentiated fragments
2 cup handle fragments
3 cup rim fragments
2 cup foot or base ring fragments
2 plate rim fragments (one with a portion of the foot or base ring exhibiting crushing from wear)
3 plate rim fragments
2 plate foot fragments with crushing from wear evident
2 saucer foot fragments with crushing from wear evident
1 saucer rim fragment
10 undifferentiated rim fragments
1 base fragment with a portion of a hallmark consisting of a lion (Fig. 43a) (F.S. 105)
2 saucer base fragments (F.S. 40 and 152) with a hallmark of "The CCTPCO / figure of a griffen / Semi Granite" (Fig. 43b). The foot rings show crushing and wear use. The hallmark is for the C.C. Thompson Pottery Company of Liverpool, Ohio. The Thompson pottery used this mark from 1870 to 1938 when it went out of business (Gates and Omerod 1982: 288).

Leather

Straps - There are three fragments of leather straps. Two appear to be from the same source since each is 1" wide with a line of holes for sewing inset 3/16" from each side. One fragment is 1-1/2" long and the other is 2-1/2" long. The third fragment is from a strap of undetermined length and width. It does have a 1/2" copper rivet still in place. The rivet appears to be a common harness style of rivet.

Shoes - At least two pair of shoes or boots are represented. There is the right heel and instep, including feather, shoulder, inside channel, and heel lifts of a machine nailed boot. A similar heel and instep is from a left boot and the third piece is also a heel of a nailed boot. All the boot heels appear to be in the cowboy style.

There is one fragment of a shoe upper which has holes for sewing along the edge and 3 brass eyelets 3/16" in diameter on a finished edge.

Anderson (1968) has chronicled the history of shoe manufacture and notes that right and left shoes were not standardized until about 1880 although they were being manufactured around 1860. Heels with lifts did not become popular until the late 1870s with the advent of the heeling machine and machine nailing of shoes was not possible before 1862 when a machine nailer was invented. The machine nailing process for the manufacture of shoes remained popular until the first quarter of the 20th century. Anderson's (1968) chronology suggests that the shoes from 25466 were manufactured between 1870 and 1925.

Miscellaneous Materials

Plaster - There are seven pieces of a chalky white plaster in the collection. The material has no inclusions in it and appears to be a calcium based plaster. Several pieces have finger prints imbedded in the plaster.

Tailor's Chalk - There is one fragment of a piece of circular blue tailor's chalk (F.S. 25).

Interpretation

The small size of the sample coupled with the fragmented and oxidized nature of the artifacts limits the interpretation potential of the Euro-American goods. However, some information can be garnered from these somewhat meager remains.

An analysis of the materials from the various structural features and the excavated trash midden reveals no discernible pattern of use or disposal. Essentially the artifacts are bits and pieces of undifferentiated trash simply scattered across the site. The artifacts themselves are not indicative of any special activities, other than domestic chores associated with housekeeping. The artifacts do indicate at least two and possibly three pairs of boots or shoes were utilized by the occupants of the site. Other wearing apparel are indicated by the glass buttons and working apparel is suggested by the presence of overall buttons. Construction on the site is indicated by the nails and bits of fencing wire;

the only items to even remotely suggest an agricultural use for the site. Transportation is suggested by the wagon yoke fragment. At least two separate firearms, possibly a rifle and a pistol are indicated by the cartridge cases. The domestic aspect of the site is indicated by the presence of glass bottles, at least two of which were patent or proprietary medicine style bottles and by the ceramics. With the exception of one piece; the possible statue base, all of the ceramics are utilitarian styles - cups, plates, saucers, and bowls. All of the base rings or feet of the ceramics show extensive crushing and abrasion which is indicative of use. The fact that the base rings show the wear and not the edges strongly suggests the ceramics were used as they were intended and not as show pieces or at least they were not stored in an upright position in plate racks (Griffiths 1978).

None of the artifacts suggest any ethnic affiliation for the inhabitants of the site although the historic documents and the architectural details indicate an occupation by Spanish surnamed individuals. No artifacts with the possible exception of the tailor's chalk even suggest a sexual affiliation for the occupants. The only thing the artifacts suggest, aside from a date range for occupation of the site, is socio-economic status. The small size of the sample, the fragmented nature of the artifacts, and the obvious wear on the ceramic assemblage subjectively suggests an occupation of the site by people of a low socio-economic status. This subjective judgment can be partially upheld by an analyses of the ceramic assemblage through ceramic styles and decorations can be used to statistically validate costs of ceramics and thus project a socio-economic status to the occupants of the site. Miller's technique has been refined by Lees and Kimery-Lees (1983) for the early to mid-nineteenth century. There is some question about the direct applicability of the technique to late nineteenth and early twentieth century sites where ceramic assemblages differ substantially from the early to mid-nineteenth century. Although these questions of suitability of application to late sites exist, a test was run on the LA 25466 ceramic material strictly as a test of the modified ceramic formula as proposed by Lees and Kimery-Lees (1983). Essentially ceramic styles are given a ranked value based on their original costs and the frequency of the styles is calculated and a formula applied:

$$\frac{\Sigma (70\ Y)}{\Sigma\ Y}$$

where: X - the value for ceramic categories

Y = the frequency of ceramics

The resulting index is then interpreted to be indicative of various levels of socio-economic standing by the occupants of the site.

In the case of LA 25466 the index is 1.9, which falls into a category of low socio-economic status based on the criteria of Lees and Kimery-Lees (1983). Without testing an adequate sample of sites of a similar age the value of interpreting the index must remain subject to further scrutiny. However, the index suggests a positive correlation with the subjective analysis of socio-economic status for the occupants of the site.

The analysis of the artifacts provides one other aspect to the interpretation and that is a range of dates for occupancy or use of the site. The cartridge cases range in date of manufacture from 1871 to 1940 in one case and 1873 to about 1925 in the other. The boots and shoes indicate a manufacturing range from the 1870s to around 1925, and the glass suggests a range of manufacture from 1870 to 1913. The hallmarks on the ceramics were used from 1870 to 1938. These dates clearly indicate a probable period of occupation from the third quarter of the nineteenth century to the second quarter of the twentieth century. Based on this author's experience with historic sites the date range could be narrowed from a broad 50 year range to about 35 years. The author bases this on his opinion that the cartridges, glass, and ceramics were probably manufactured and used between 1890 and 1915. This date range is based on experience of handling a substantial number of historic artifacts, also based on the introduction of manufacturing techniques used in the manufacture of these items. Admittedly this is a speculative opinion based solely on judgment and experience.

The artifact assemblage from LA 25466 is meager at best, but it does offer some insight into a potential range of dates for occupation of the site and a suggestion of socio-economic status for the occupants of the site. The site appears to have been used or occupied from about 1880 to about 1925. The artifacts do not appear to be patterned in their deposition and do not appear to be suggestive of occupation, sex, or ethnicity. They do subjectively and quantitatively indicate the occupants of the site were of a relatively low socio-economic status.

Lithic Artifacts

A total of 190 lithic artifacts were recovered at site 25466, 90 from surface contexts and 100 from subsurface contexts. The distribution of surface artifacts, including lithics as well as ceramics and Euro-American artifacts, is shown in Figure 44. Lithic artifact types include pecked stone, drills, bifaces, scrapers, and utilized and non-utilized flakes.

Biface

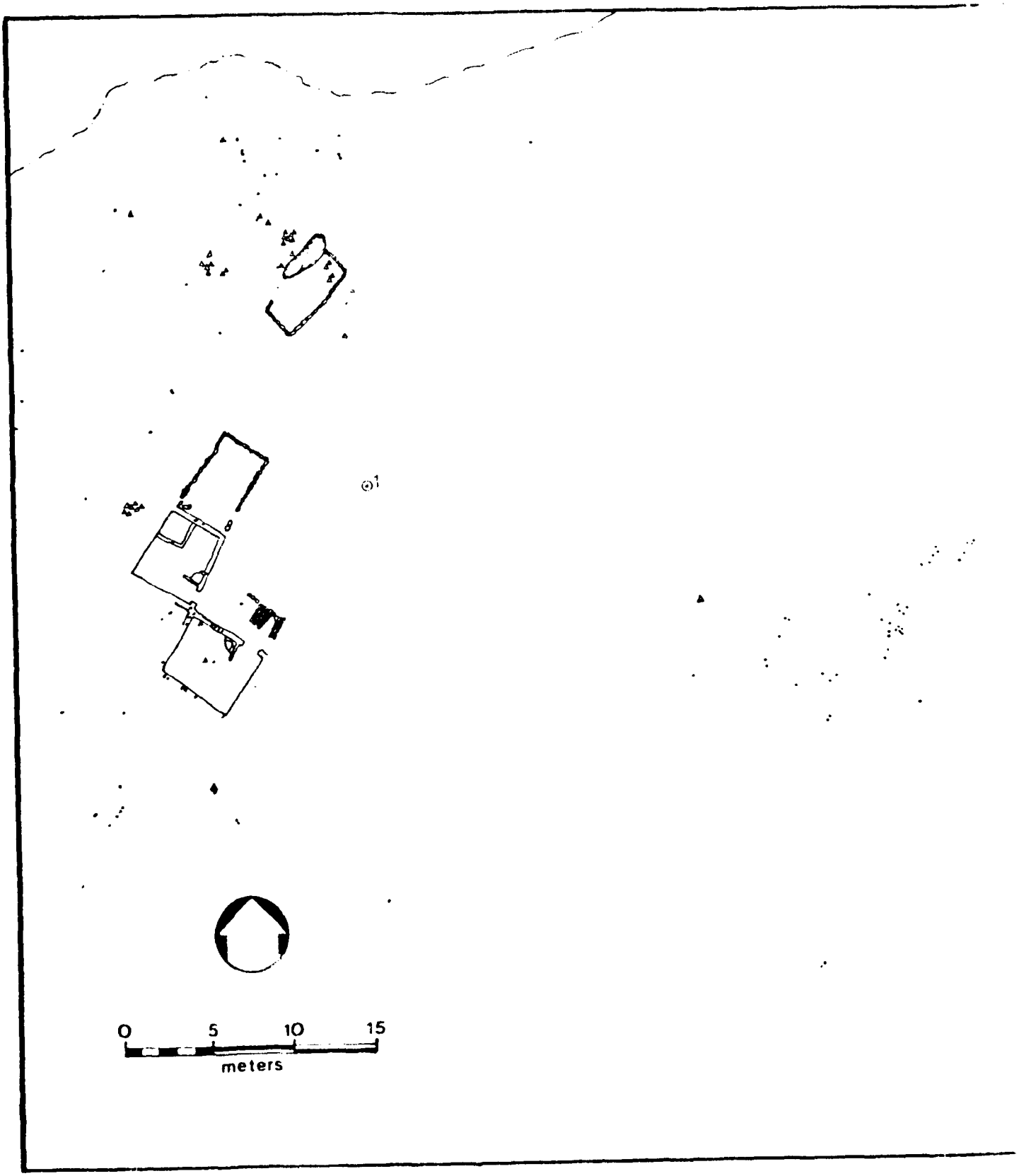
A single biface fragment was recovered (Fig. 45a). The artifact (F.S. 199 #163) is obsidian, and represents a corner of an apparently triangular tool. Flaking is bifacial and rather crude. The artifact may have served as a cutting implement or a preform.

Scraper

This white and red chert artifact (F.S. 199 #3)consists of a flake with unifacial modification along the distal end. The unifacial modification and apparent wear suggests that the artifact functioned as a scraping tool. The artifact is illustrated in Figure 45b.

Drill

A white chert drill fragment (F.S. 45) was recovered. The entire bit is missing, leaving only the base (Fig. 45c). The shape of the base is similar to other stone drills found on aboriginal sites in the region.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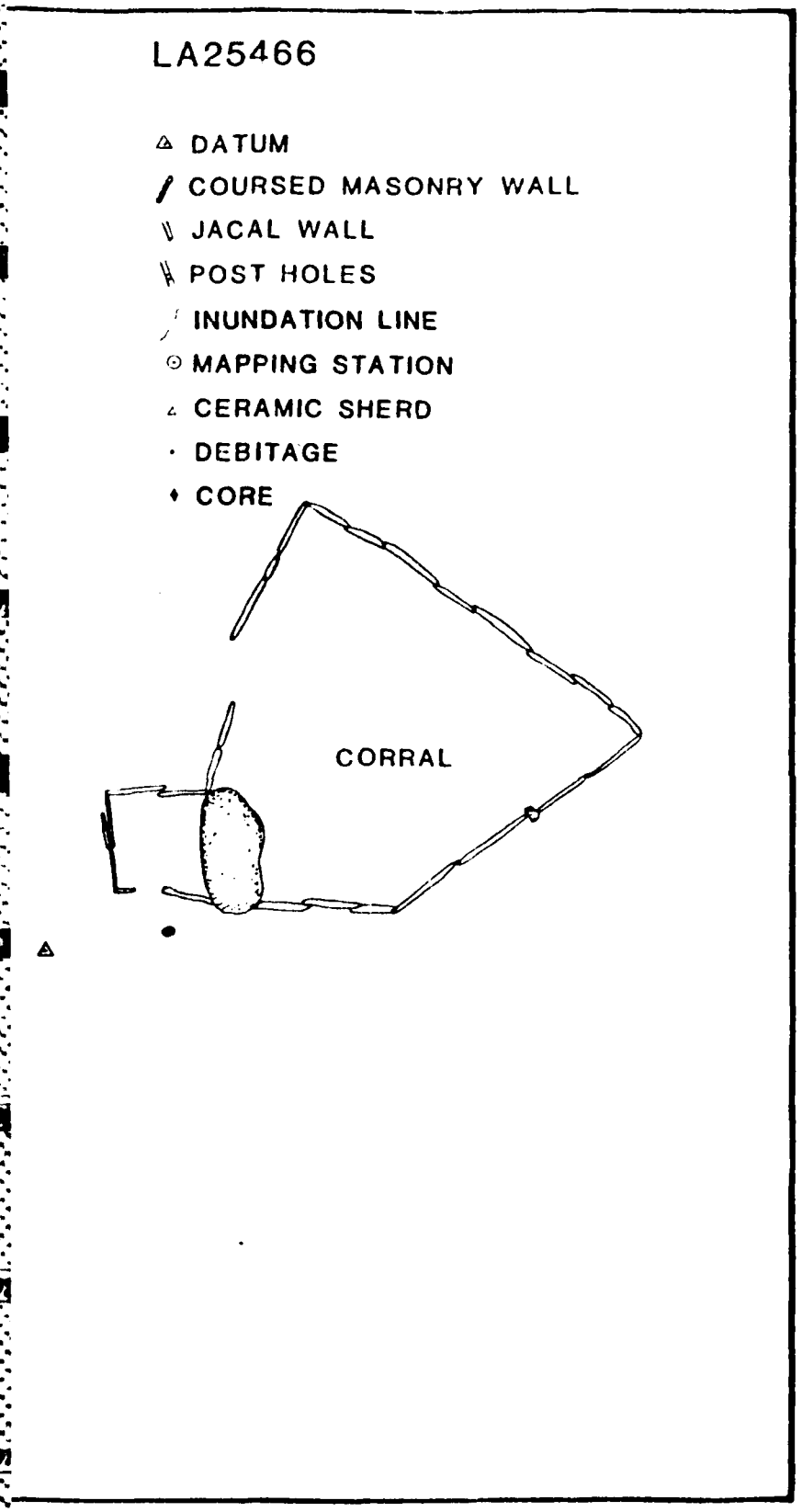


Figure 44. Plan view LA 25466 showing the distribution of surface artifacts.

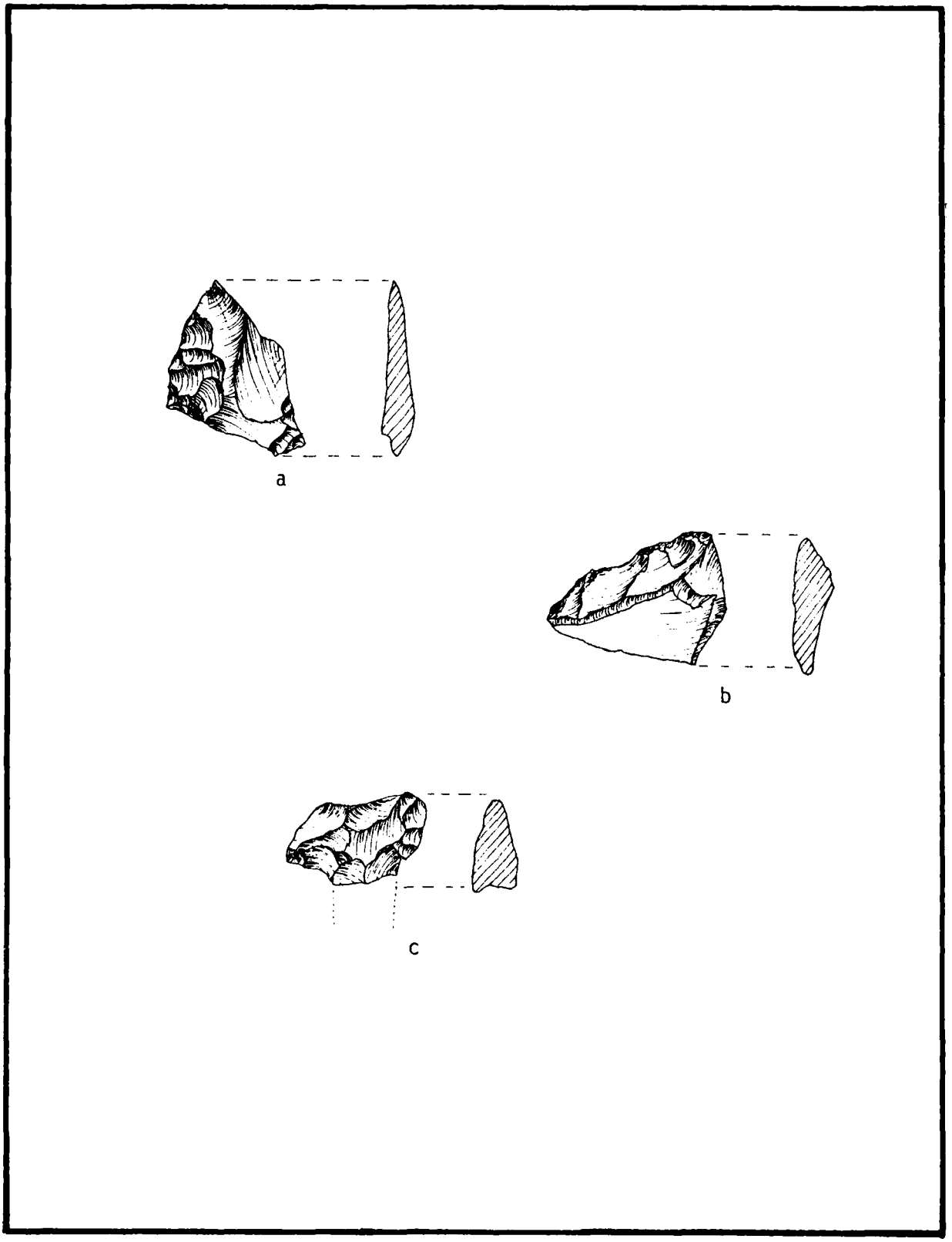


Figure 45. Prepared chipped stone artifacts recovered at LA25466.

Pecked Stone

One surface artifact (F.S.199 #160) consists of a red quartzite river cobble, about the size of a typical one-hand mano (Fig. 46). The tool has been pecked on both sides, and evinces battering on its two ends. No grinding is discernible. The battering indicates use as a hammerstone. The purpose of the pecking is unknown, but may represent use of the cobble as an anvil in bipolar flintknapping.

Cores

Three lithic cores were recovered. Two are obsidian and measure 66 and 51 mm in length, 48 and 45 mm in width, and 29 and 26 mm in thickness. This compares to the remaining core, made of apparently local chert, which measures 113 mm in length, 60 mm in width and 38 mm in thickness. Since raw obsidian is unavailable in the Piedra Lumbre Valley, these cores were transported some distance to the site. That the obsidian cores are smaller than the presumably local chert core suggests more thorough reduction of the more valuable material type. None of the cores were utilized.

Utilized Flakes and Debitage

A total of 183 flakes, or 97 percent of the total lithic assemblage, are placed into this category. Flakes evincing utilization number only three; two with unifacial wear along a margin and one with bifacial wear along a margin. The remaining 180 artifacts show no *apparent utilization.* Chert, most of it apparently locally procured, is the most common lithic material. Eighty-six percent of the flakes are chert, and 14 percent are obsidian. A single quartzite flake was found. Cherts are primarily white in color, although gray, black, and brown cherts were also present in substantial numbers. Flakes tend to be rather large, averaging 26.3 mm in length, 24.9 mm in width and 9.4 mm in thickness. Analysis of cortex cover on the flakes dorsal surfaces suggests that various stages of lithic reduction occurred on the site. Fifteen, or eight percent of the total, are classified as primary flakes, and 25, or 14 percent, are classified as secondary flakes. Interior flakes, lacking any cortex, number 143, or 78 percent of the total. Platform preparation is infrequent, being noted on approximately two percent of the flakes. Such preparation appears as removal of an overhang on the flakes dorsal surface or crushing. Platform lengths and widths averaged 4.4 and 1.6 mm respectively.

Five obsidian artifacts were submitted to A & G Analyses of Provo, Utah, for trace element analysis. Two sources, A and C, were identified. According to A & G Analyses personnel, obsidian source A has been identified as Polvadera Peak in Rio Arriba County, and source C is Obsidian Ridge of the Jemez Mountains, Sandoval County, New Mexico. The results of the trace element analysis are presented in Table 16.

Aboriginal Ceramics

The aboriginal ceramics recovered during the investigation of LA 25466 are classified into four types: Tewa Black, Tewa Red, Penasco

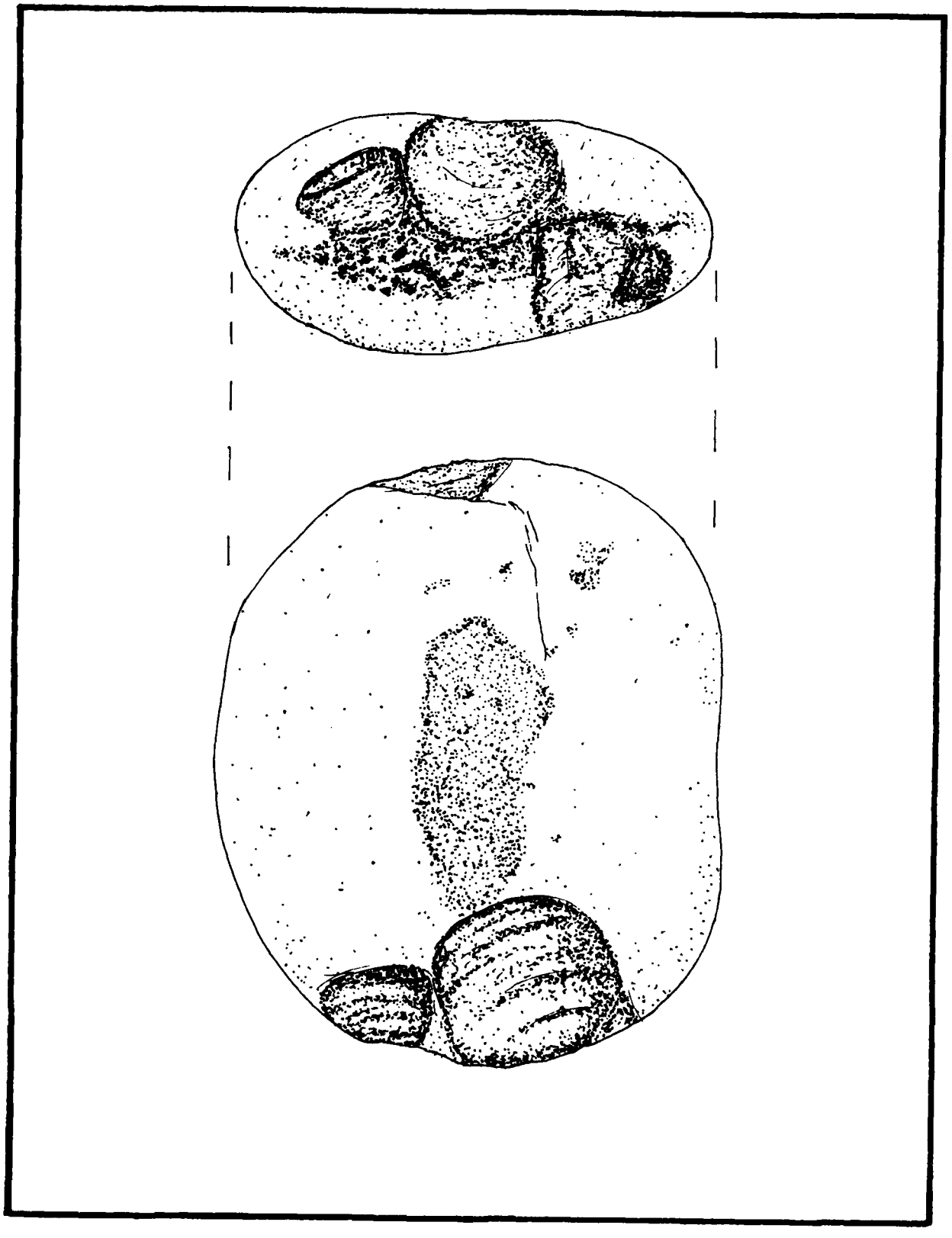


Figure 46. Pecked and battered river cobble found at LA25466.

TABLE 16

Results of Analysis of Chemical Composition for Sample of Obsidian Artifacts Collected from LA 25466

Sample Number	Provenience	Hydration Analysis I.D. Number	Chemical Composition[a] Rb ppm	Sr ppm	Y ppm	Zr ppm	Nb ppm	MnO %	Fe_2O_3 %	TiO_2 %	Ba ppm	Na_2O %	Obsidian Source
1270	FS19	N6A 15	141.9	9.5	29.9	109.3	59.8	.066	.64	.088	20.5	4.68	A
1271	FS27	N6A 16	201.9	6.0	69.5	214.2	114.5	.084	1.30	.083	6.7	5.04	C
1272	FS141	N6A 18	147.8	9.0	25.5	108.3	56.0	.066	.57	.092	18.7	4.75	A
1273	FS173	N6A 19	200.3	2.5	72.2	214.8	114.8	.085	1.25	.083	7.9	5.06	C
1274	FS177	N6A 17	150.5	11.1	31.1	114.7	65.6	.066	.60	.091	20.2	4.77	A

* ppm = parts per million

Micaceous, and an unknown type. The former three ceramic types are those discussed by Schaafsma (1979) in his Cerrito site study. Consequently, types such as Tewa Black may include Kapo Black and Apodaco Gray types, and Tewa Red may include Posuge Red and San Juan Red-on-orange. The Tewa types were probably manufactured at San Juan Pueblo, and the Penasco Micaceous ceramics probably emanated from Picuris (Schaafsma 1979).

A total of 127 aboriginal sherds was found at the site. Fifty-eight, or 46 percent are classified as Tewa Black, and 32, or 25 percent of the total, are Tewa Red. Penasco Micaceous sherds number 35, and comprise 28 percent of the total. Two sherds were unidentified. The two are gray and are poorly fired. Notable are what appears to be interstices formed by the use of an organic temper.

Faunal Remains

A total of 119 animal bones was recovered during the investigation of LA 25466. All were found in association with the habitation structure, Feature B, or the trash area. The bones tended to be fragmentary, and only six were identified at the genera or species level. Of these, five are either goat or sheep and one is horse. Table 17 below presents the taxa identified in the bone sample recovered at the site, and the elements identified and their frequencies are presented in Appendix E. Both burned and unburned bones were found. A considerable number of the large mammal bone display butcher marks suggesting that either domestic large animals or hunted game were processed and consumed at the site.

TABLE 17

Taxa identified at Site LA 25466
with total number of bones

Taxon	No. Bones
Mammalia, large	58
Mammalia,	41
Mammalia, small	1
Artiodactyla	13
Ovis-Capra	5
Equus	1
Total	119

Floral Remains

Pollen and macrofloral analysis provided considerable insight into the types of flora utilized at LA 25466. As indicated in Appendix A,

soil samples and pollen samples were collected in vertical increments in the trash midden and from the floor surfaces and hearths in Features A, B, and C. The trash midden yielded the most macrofloral materials, including charred corn cob fragments, peach pits, charred and uncharred Amaranthis, charred Chenopodium, Graminae, and Triticum aestivum (wheat) seeds. Corn (Zea) and large frequencies of wheat (Triticum) pollen were also discovered in the trash, as were several native species commonly associated with disturbed soils. Feature B yielded corn cob fragments and various post-abandonment, low-spine Compositae pollen types.

The hearth contents inspected for macrofloral remains contained charred and uncharred Amaranthus blitoides seeds, and uncharred Cleome or Polansia sp. and Rhus seeds. Pollen samples collected on the floor surface of Features A and C yielded evidence of post-abandonment weed colonization and some species of economically-important plants. Wheat (Triticum) pollen was present on all the floors of the habitation strutures, and corn (Zea) was observed in samples collected in the south room of Feature C.

Interpretations

Chronology

As discussed above in a discussion of the dating results, obsidian hydration studies suggest that the lithics discovered on the site may be contemporaneous with the Euro-American occupation, or pre-date the occupation by a few decades. The rather large number of lithic artifacts, especially as revealed by the excavation of Test Unit 2, may indicate that aboriginal groups, possibly Ute, are responsible for the materials, as it seems probable that aboriginal groups were more dependent upon lithic technology than Hispanic ranchers. On the other hand, lithic artifacts had a broad distribution across the site, as shown in Appendix B. Lithics were recovered not only from the area of surface concentration between the corral and the house, but also in the trash area, Feature B, and the fill in all rooms of Features A and C. The house comprising Features A and C is not in a depression or on a steep slope, making slope-wash a tenuous proposition for explaining the presence of lithics within the structure. Unfortunately, too few floor artifacts were discovered to confidently determine the association of the lithics with the house. Richard Chapman (personal communication 1982) reports of early Hispanic sites in the Cochiti Reservoir area that yielded evidence of a rather unsophisticated chipped stone industry. Since suitable raw materials are so abundant in the Piedra Lumbre area, and since the Hispanic occupation was clearly an isolated frontier settlement, perhaps a case can be made for Hispanic affiliation of the stone tools found at LA 25466.

The termination of occupation at the site may best be indicated by the diagnostic Euro-American artifacts. In his section on Euro-American artifacts, Scott notes that temporally diagnostic artifacts indicate an occupation between A.D. 1890 and 1915. It is therefore likely that the site was abandoned at approximately 1915.

Site and Structure Formation

Site 25466 functioned for habitation and ranching purposes. The function of Feature D, the corral is apparent, although the species of domestic animals contained is unknown. Sheep or goat bones found at the site suggests that these species may have been herded into the corral; the corral is certainly substantial enough to have contained horses or cattle too. Feature E, a structure apparently associated with the corral, may have served for storage of tack or as a sheltered area for lambing. That the excavation unit dug within the feature failed to recover any architectural or artifactual materials suggests the latter use.

The excavation of Feature B suggests that this outbuilding served for storage purposes. The sloping, somewhat undulating floor surface indicates that human occupation was unlikely. Pollen analysis indicates that Feature B may have functioned to store grain. Corn (Zea) pollen was noted in a floor sample collected within the feature.

Feature A and C served as a habitation structure. The presence of firehearths in the south rooms of Features A and C indicate that most domestic activities, such as food preparation and consumption, and sleeping, probably occurred in these rooms. Charred seeds were collected in both rooms, but were absent in other rooms. Intensive use of these rooms is also supported by greater quantity of artifacts and more substantial floor surfaces. That the primary inhabitation rooms were located on the south side of the house was probably an attempt to maximize the use of solar energy.

The north rooms of Features A and C may have served for food and equipment storage. Such would have been relatively secure so close to the primary habitation areas. These two rooms appear to be devoid of interior features. They further have poorly defined floor surfaces and comparatively few artifacts.

Site LA 25466 probably served as a seasonally occupied base from which sheep, goat or possible cattle herding operations emanated. A wide range of ranching and domestic activities probably were conducted at the site. Small scale gardening may also have been conducted near the site to augment supplies brought in, but the absence of large areas suitable for farming in the immediate area suggests that farming was minimal.

Subsistence

The subsistence activities practiced by the Euro-American occupants of LA 25466 appears to be consistent with regional historical accounts. Subsistence was based upon the raising and processing of domestic animals, processed food items probably obtained through a cash or barter economy, small-scale farming or gardening, and probably hunting and gathering. That domestic animals were utilized for food is indicated by the analysis of recovered animal bones. Five Ovis-Capra bones and numerous unidentified large Mammalia or Artiodactyla bones, some of which have butcher marks, indicate that sheep or goats were consumed. Some

of the unidentified bones may represent hunted species. Certain foodstuffs were undoubtedly transported to the site, as evidenced by the presence of tin can fragments. Other food items too were probably brought to the site such as corn, wheat and peaches. It is probable that these food items were grown in nearby communities, although the possibility of on-site origin cannot be discounted. Soil samples collected in the south room of Feature A yielded charred Amaranthus, and the trash area yield charred and uncharred Amaranthus, Chenopodium and Graminae seeds. These species are native to the site vicinity, and may represent gathered foodstuffs. The diet appears to have been varied.

Future Analysis

While the present contract concerned only the recovery of archaeological data at LA 25466, is is possible that additional information on the site can be obtained through the interviewing of local informants and inspection of Rio Arriba County records. An unsuccessful attempt to contact one possible informant, Mr. Uvaldo Velasquez of Youngsville, New Mexico, was made, and future efforts by other researchers along these lines may be productive.

CHAPTER VI

SITE LA 25469

Introduction

Archaeological site LA 25469 is an extensive deposit of chert nodules, cores, debitage, and tools. It is located on a low terrace southwest of the confluence of the Rio Puerco and Rio Chama; site elevation varies from 6180 to 6230 feet (1884 to 1899 meters) above sea level (Figure 47). The site was first recorded in 1975 by the School of American Research (Schaafsma 1976:13, 61, 62) as a pedregal quarry where natural deposits of chert boulders and cobbles had been exploited for chipped stone tools. The site covered an area of approximately 100,000 square meters (575 meters northeast-southwest and 390 meters northwest-southeast). The absence of diagnostic artifacts precluded the possibility of assigning an age or cultural affiliation to the site occupation(s).

The site was revisited in 1982 by personnel from Nickens and Associates to evaluate the present condition of the site and to make site specific management recommendations (Reed et al. 1982). This revisitation determined that episodic inundation by Abiquiu Reservoir had destroyed at least 50 percent and possibly as much as 85 percent of the original site area, stripping off the shallow soil cover, exposing the sandstone bedrock, and removing most of the cultural materials. Although artifacts were still present in a reduced area of approximately 52,500 square meters, only that portion of the site atop a narrow, east-west oriented ridge in the northeast corner of the original site area was considered to have been relatively unaffected by inundation and downslope movement; the area of this ridgetop is approximately 450 square meters. A single one meter square test unit was excavated on the ridgetop to 50 cm below present ground surface. This excavation yielded a total of 16 artifacts, all chipped stone, of which the majority were recovered from the top 10 cm; decreasingly smaller numbers of artifacts were found in the deeper levels of the test unit. The presence of relatively substantial buried cultural materials suggested that subsurface features such as hearths may be present, the contents of such features providing important information on chronology and subsistence.

LA 25469 is located in the Sediment Reserve Impact Unit and will likely be subjected to long-term inundation and sediment deposition. As a consequence of these pctentially deleterious impacts upon the integrity of the site, the project scope-of-work has specified that the following activities be performed at LA 25469:

1) prepare a detailed site map;

2) conduct controlled surface collection, test excavations, and controlled excavations so as to define intrasite activity areas, assemblage composition, occupation history of the site,

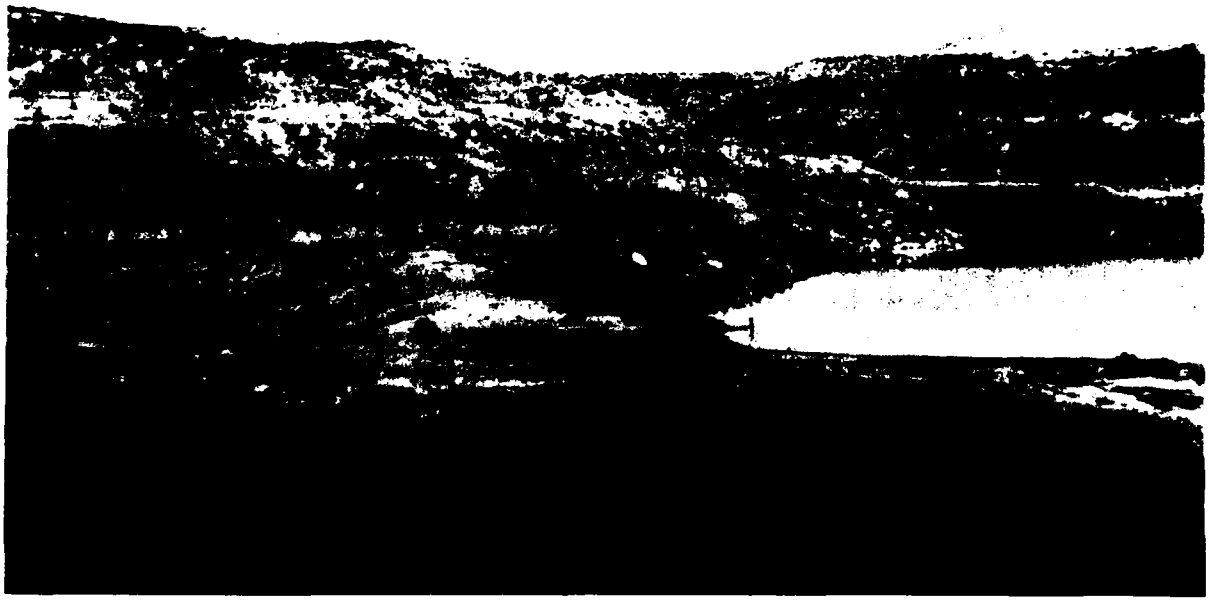


Figure 47. Overview of LA 25469, located atop the narrow ridge visible in the lower center of the photo. Abiquiu Reservoir is at the right and the Rio Puerco flows around the base of the ridge in lower left.

seasonality of occupation, subsistence strategies, chronology, and cultural affiliation; and,

3) identify and describe lithic quarry materials.

In this chapter we describe the manner in which data pertinent to the accomplishment of these objectives at this particular site were gathered, explain the results of this data collection, and interpret those results. The headings of the major chapter sections reflect this organizational scheme.

Field Methods

The first task was to prepare a map showing the spatial relationships of cultural features, prepared tools, artifact concentrations, and local topographic features on the site. The site datum was established at the steel rebar stake which was emplaced in the center of the highest portion of the ridgetop by Reed et al. (1982) during their revisitation of the site. Over this datum a metal tripod holding a Brunton compass was set up for mapping operations. Given the linear extent of the ridgetop, six mapping stations (M.S. 2-7) were established in selected locales across the site and provenienced to the datum.

Mapping the western portion of the site was accomplished by crew persons systematically inspecting the ground surface for artifacts and marking the locations with a metal pin flag. A second crew meanwhile plotted the locations of these marked artifacts with a compass and 50 m tape. Provenience information and artifact descriptions were entered onto a Mapping Data form. For chipped stone artifacts this description consisted of material type, color, manufacturing stage (primary, secondary, or tertiary flake), presence of modification and type, and length; if encountered, prepared chipped stone tools, ceramics, ground stone, and features were also recorded on this form. A 20 percent sample, or every fifth artifact, was collected for further analysis in the lab. Efforts were also made to collect any obsidian artifacts which were encountered.

The point mapping of all surface artifacts in the western section of the site revealed the existence of an exceptionally large number of artifacts. It was realized that the continuation of such point mapping would require too much time and manpower to complete. In accordance with recommendations specified in the project proposal, it was deemed prudent to complete the inventory of the surface artifacts using a sampling approach. Consequently, a sketch map of the lower, eastern section of the ridge was drawn on metric graph paper and a grid system superimposed over this sketch map. The units in this grid, each measuring 16 square meters (4 meters on a side), were numbered and a table of random digits was consulted to select a 10 percent sample.

The selected grid squares were divided into 16 one meter square subunits. These subunits were given letter designations, starting with A in the upper right hand corner and proceeding back and forth from one side to the other across the square and culminating with P in the lower right hand corner. Any artifacts found within subunits D, G, and N were collected for laboratory analysis. Artifacts within the remaining 13 subunits were

analyzed in place and not collected. Data obtained from the non-collected artifacts included length, material type, color, stage of reduction, and the presence or absence of utilization or modification, and were recorded on a sample unit inventory form.

As mentioned previously, 50-85 percent of the original site area has been destroyed through inundation by Abiquiu Reservoir, the slopes of the ridge included in this disturbed area. To test the combined effects of inundation and downslope movement, 5 additional sample units were established along the south slope of the ridge, below the western section. All artifacts found within these inundation sample units were measured and described in the same manner as were the other sample units; no artifacts, however, were collected.

Another project goal was to evaluate the suitability of local gravel deposits for lithic tools. Consequently, 21 quarry analysis units, each measuring 4 square meters, were randomly established: 12 units on the ridgetop, 7 on the slope of the ridge below the inundation line, and 2 at a short distance from the ridge amidst a concentration of boulders and cobbles. All rocks larger than golf ball size were counted, measured (length, width, and thickness), and classified according to material type, color, origins (river cobble or angular block), and condition (whole or fragmentary).

The subsurface character of the site was ascertained through excavation of 13 test units. The locations of eight of these units were determined randomly. Five of these Random Units (or R.U.s) were placed in the eastern section of the site; the other three were situated on the western end. The other five test units (referred to as Controlled Units, or C.U.s) were nonrandomly placed near concentrations of surface artifacts or unusual manifestations of possible cultural origins.

All test units measured one meter square and were excavated in arbitrary 10 cm levels, the dirt being passed through 1/4 inch mesh screen. Portions of artifact bearing strata within the C.U.s were also screened through 1/16 inch mesh so as to recover microlithic material which might otherwise be lost in the larger mesh screen. All artifacts recovered from the screen were retrieved and collectively bagged according to unit and arbitrary level. Standard field notes and records were kept, and appropriate photographs were taken. All test units were completely backfilled once the excavations had been completed. A pollen column was collected from one of the C.U.s in one liter samples collected at regular 5 cm intervals from one wall of the test unit; a seventh sample collected from the modern surface accompanied this column.

Results

This section provides specific details on the results of these investigations at LA 25469. Description of the surface materials, including the quarry analysis units, is followed by a discussion of the test excavation results.

Surface Materials

The locations of all surface artifacts on the higher western half of

of the ridgetop were determined precisely by measuring the distance and azimuth of each from the site datum or a mapping station. The eastern side, however, was gridded into square units and a random sample of these units chosen for further inspection. The results of these two procedures are displayed in Figure 48.

The western half is depicted as a pattern of points, each point representing an individual artifact. A visual inspection of this pattern reveals the presence of at least two clusters of artifacts: one at the western end of this area of the site around M.S. 4, and the other located at the opposite end of this section around the site datum and M.S. 5. One may test the reality of this apparent clustering through the application of the variance/mean ratio test.

> For a random distribution of points, the variance/mean ratio (V/m) is equal to one: for a regular distribution it is less than one. The significance of departures of the observed ratio from a value of one can be tested by comparing the index of dispersion, (V/m) x (n-1), where n is the number of quadrats, with the X^2 statistic for (n-1) degrees of freedom (Hodder and Orton 1976:34).

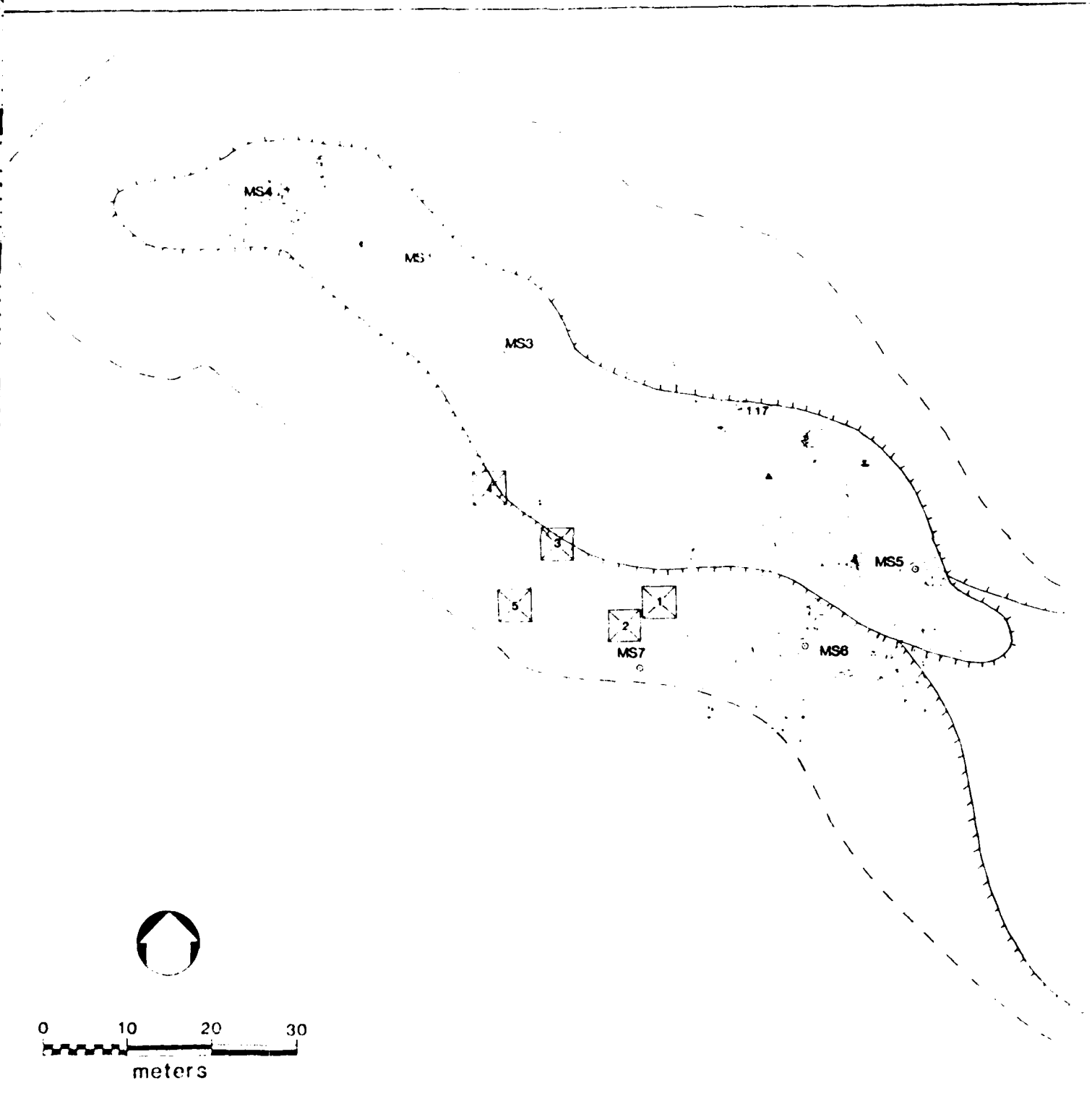
Application of the variance/mean ratio test at LA 25469 was accomplished by first overlaying the western half with a rectangular matrix of 5 m x 5 m quadrats and counting the total number of points (artifacts) within each quadrat. A matrix of 14 x 28, or 392, quadrats was needed to cover the area. The number of artifacts contained within each quadrat ranged from 0 to 120, the mean number of artifacts/quadrat (x) being 3.75. Since the variance (s^2) is 119.528, the variance/mean ratio (s^2/x) is equal to 31.874. The sign and magnitude of this value indicates that the pattern of artifacts is highly clustered. The index of of dispersion for this clustered distribution is equal to 124462.8, a value which with 391 degrees of freedom is highly significant, the probability of obtaining a value greater than this less than 0.001. The reality of artifact clustering in this area of the site appears to be confirmed.

Superimposition of a grid over the eastern section of the ridge resulted in the delineation of 245 units measuring 25 square meters. Out of this population, a sample of 25 units (10 percent) was chosen randomly; the locations of the chosen units are shown in Figure 48.

Artifacts recorded encompass 2,131 pieces of chipped stone and 3 ceramic fragments. Included in the chipped stone assemblage are 1,764 non-collected and 367 collected artifacts; all of the ceramics were collected. The composition of each of these three groups are described below under separate headings.

Non-Collected Chipped stone

Slightly less than 20 percent of the artifacts encountered on the site were collected, consisting of 1,220 artifacts from the western half of the site, 486 from the eastern half, and 58 from the five units placed on the ridgeslope. The following information was recorded for each artifact regardless of its location: material type, color, description (flake,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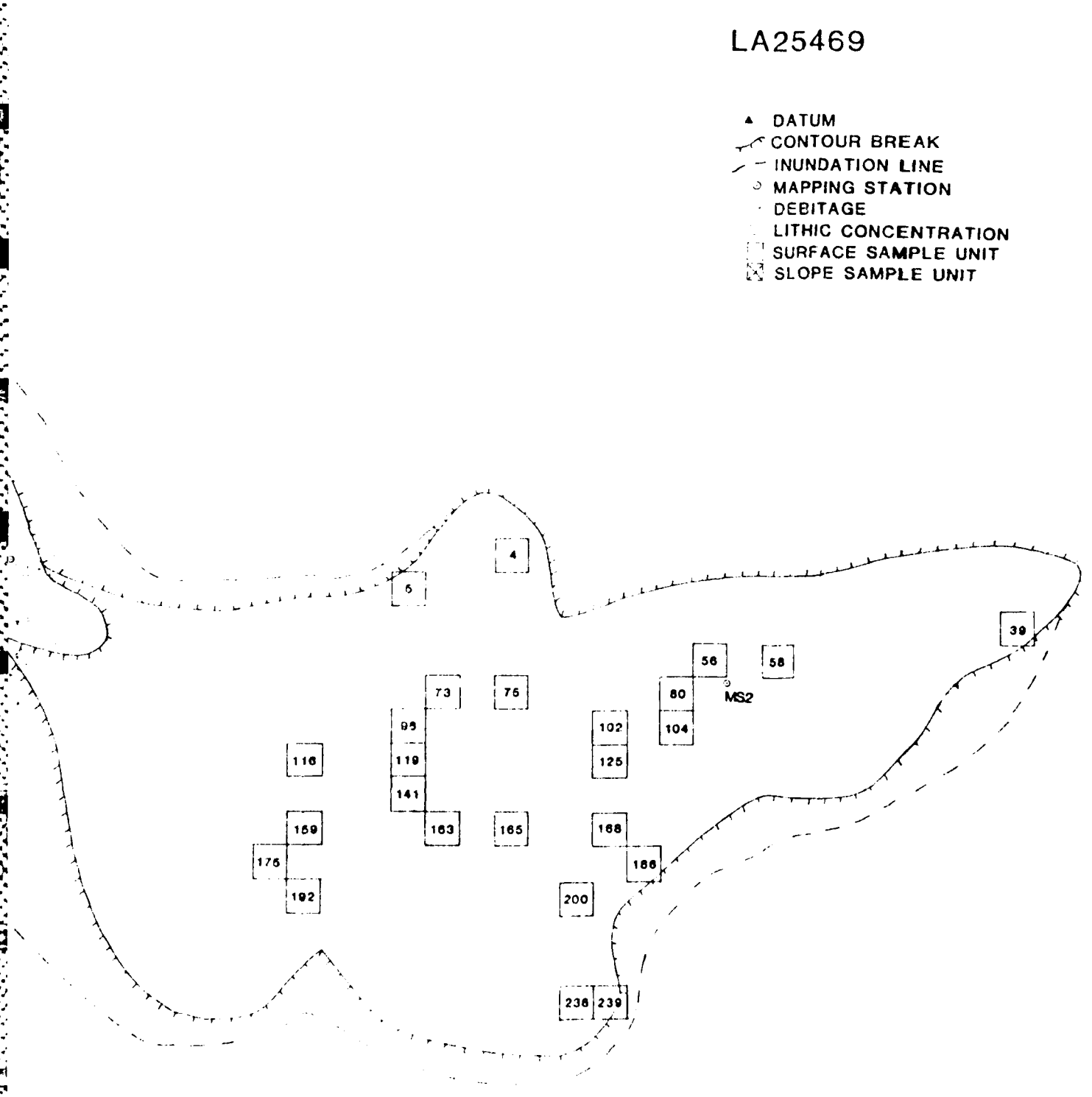


Figure 48. Map of LA 25[illegible] locations of [illegible] artifacts, surf[illegible] units, and t[illegible] details.

core, core shatter, or prepared tool), and length; manufacturing stage (primary, secondary, or tertiary) was also noted for each flake.

For the western half of the site, tertiary flakes dominate the chipped stone assemblage. Material type frequencies are: chert, 1,194 artifacts; quartzite, 20 artifacts; obsidian, 2 artifacts; and other, 4 artifacts. The other category includes limestone, chalcedony, and unidentified types. The very low frequency of obsidian is a reflection of the fact that most of the artifacts made of this material were collected. More variety is expressed in the numbers of artifact types. For the debitage, tertiary flakes predominate (697 flakes), followed by secondary flakes (300), and primary flakes (173); a few of the flakes appeared to have been utilized or retouched. Cores were relatively abundant (48) but no core shatter or prepared tools were observed. Two cobble choppers were also recorded.

The artifactual contents of the randomly selected sample units are listed in Table 18 (sample units without any artifacts are not included). From 1 to 137 artifacts were recorded within each of the sample units; the mean number of artifacts/sample unit is approximately 22. Again, tertiary chert flakes comprise the majority of the artifacts. Quartzite is the second most abundant material type, obsidian is rare and cores are relatively abundant. Primary flakes are more abundant, however, than secondary flakes, an observation which distinguishes the east half of the site from the west half. One prepared tool, a biface tip, was recorded in sample unit number 58 and subsequently collected. This biface fragment is manufactured from a black speckled white chert, is thin and finely flaked on both faces, has convex blade margins, and is bi-convex in profile (see Figure 49b). The mean length of all artifacts from randomly selected sample units is slightly more than 3 cm.

Finally, Table 19 lists the artifactual composition of each of the five sample units which were established on the slopes of the ridge. The mean number of artifacts/unit was 10.6, the units containing a minimum of 6 artifacts and a maximum of 19. With one exception (a single obsidian flake), all of the artifacts were made of chert. A nearly equal distribution of manufacturing stages is present among the flakes: tertiary flakes are only slightly more abundant, followed by secondary and primary flakes. Cores are not overly abundant and a few pieces of core shatter were found. One prepared tool, and end scraper, was recorded in Unit 2. The mean length of all artifacts from the sample units on the ridge slope approaches 5 cm.

Collected Chipped Stone

Every fifth artifact of those which were point mapped, and all artifacts contained within 3 of the 16 one meter square subunits of the sample units, were collected. This collection consisted of 367 artifacts: 244 from the west side and 123 from the east side. Analysis consisted of isolating and describing a group of specific morphological characteristics of each artifacts, the characteristics of which should help provide insights into the parameters of aboriginal lithic technology at this locality and, by comparison with similar sites, throughout the immediate region.

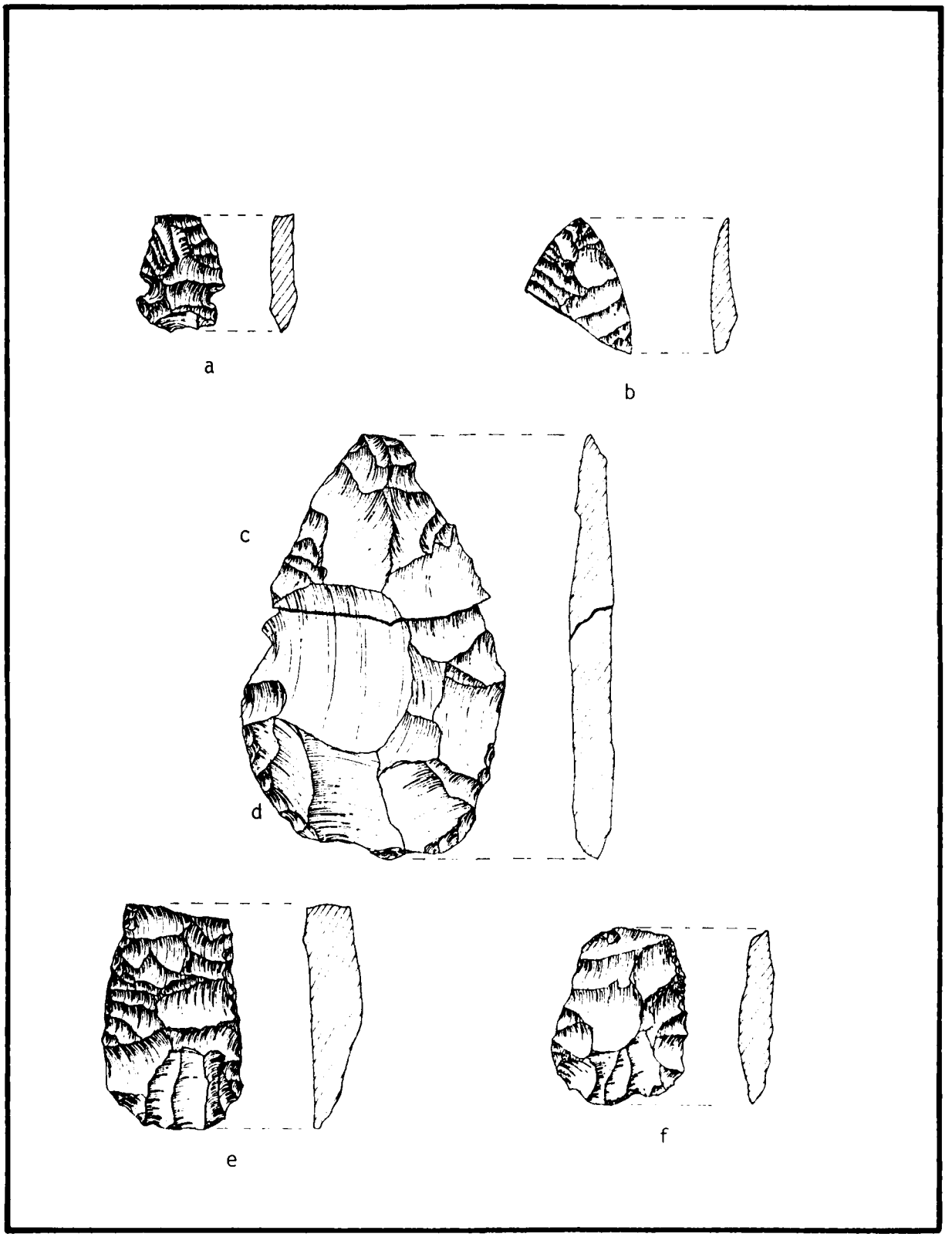


Figure 49. Prepared stone tools collected from LA25469: a, projectile point (F.S. 59); b, biface tip(F.S. 91); c, biface tip(F.S. 58); d, biface base(F.S. 93); e, scraper(F.S. 63); f, biface(F.S. 92).

TABLE 18

Summary of Chipped Stone Artifacts Recorded In Place
Within Surface Sample Units at LA 25469

Sample Unit No.	Material				Description						Length (cm)	
	Chert	Quartzite	Obsidian	Other	Flake[a] 1°	2°	3°	Core	Core Shatter	Prepared Tool	Mean	S.D.[b]
56 (n=45)	44	0	1	0	1	1	43	0	0	0	1.80	0.86
58 (n=137	137	0	0	0	4	6	125	1	0	1	2.24	1.42
73 (n=13)	13	0	0	0	0	3	10	0	0	0	2.47	1.13
75 (n=3)	3	0	0	0	0	0	3	0	0	0	2.67	1.19
80 (n=8)	6	2	0	0	0	0	8	0	0	0	1.98	0.46
96 (n=29)	29	0	0	0	0	0	29	0	0	0	2.40	0.87
102 (n=3)	3	0	0	0	0	0	3	0	0	0	2.10	1.59
104 (n=9)	9	0	0	0	0	0	9	0	0	0	2.19	0.60
116 (n=11)	10	1	0	0	5	2	4	0	0	0	3.47	1.64
119 (n=14)	14	0	0	0	0	2	12	0	0	0	2.14	0.73
125 (n=8)	8	0	0	0	0	0	7	1	0	0	1.82	1.35
141 (n=7)	7	0	0	0	0	0	7	0	0	0	2.14	0.99
159 (n=100)	98	2	0	0	3	11	81	5	0	0	2.83	2.03
163 (=2)	2	0	0	0	0	0	2	0	0	0	2.35	0.64
165 (n=6)	6	0	0	0	1	2	2	1	0	0	5.23	2.98

TABLE 18
(Cont'd)

Sample Unit No.	Material				Description						Length (cm)	
	Chert	Quartzite	Obsidian	Other	Flake[a] 1°	Flake[a] 2°	Flake[a] 3°	Core	Core Shatter	Prepared Tool	Mean	S.D.[b]
168 (n=5)	5	0	0	0	3	1	1	0	0	0	4.84	1.96
175 (n=6)	6	0	0	0	3	2	0	1	0	0	3.67	1.51
186 (n=41)	41	0	0	0	13	13	1	14	0	0	6.33	3.14
192 (n=24)	17	7	0	0	12	1	4	7	0	0	5.52	3.91
200 (n=1)	1	0	0	0	0	1	0	0	0	0	4.40	-
238 (n=3)	3	0	0	0	2	1	0	0	0	0	5.73	2.04
239 (n=11)	11	0	0	0	6	3	0	2	0	0	5.18	1.66
N=486	473	12	1	0	53	49	351	32	0	1	3.34	1.49

[a]For Flakes: 1° = primary, 2° = secondary, 3° = tertiary

[b]S.D. = standard deviation

TABLE 19

Summary of Chipped Stone Artifacts Recorded
Within Five Talus Slope Sample Units
at LA 25469

Unit	Material			Flake[a]			Core	Description		Length (cm)	
	Chert	Quart-zite	Obsidian	1°	2°	3°		Core Shatter	Prepared Tool	Mean	S.D.[b]
1 (n=12)	11	0	1	5	1	4	2	0	0	5.55	3.66
2 (n=19)	19	0	0	4	8	6	0	0	1	4.21	1.62
3 (n=8)	8	0	0	2	3	2	0	1	0	4.10	2.12
4 (n=6)	6	0	0	2	0	4	0	0	0	3.70	1.59
5 (n=13)	13	0	0	2	4	2	2	3	0	5.28	2.38
N=53	52	0	1	15	16	18	4	4	1	4.57	0.80

[a]For Flakes: 1° = primary, 2° = secondary, 3° = tertiary

[b]S.D. = standard deviation

The variables which were used to analyze the collected chipped stone artifacts from LA 25469 are identified and described in Table 7 in Chapter IV. The first ten variables serve to assign a unique numerical designation to each artifact and to fix either its precise or approximate location on the site. Each of the remaining 27 variables describes one external characteristics of the artifact; one or more of these variables are grouped into sets which portray such general attributes as size, appearance, and morphology. The absolute and relative frequencies of the 21 nominal level attributes for all collected surface artifacts are summarized in one of the columns of Table 20.

If these results are compared with the observation made on the non-collected artifacts, the general similarities between the two data sets is apparent. Chert debitage predominates, this debitage composed primarily of tertiary flakes, followed by smaller amounts of secondary and primary flakes. Cores are relatively abundant and prepared tools are scarce, the only two examples of the latter among the collected surface artifacts being two bifaces. The interval level measurements of length, width, thickness, platform length, and platform width are summarized in Table 21.

The other variables recorded for the collected artifacts contain important information on technological parameters of lithic manufacture expressed at this site. Full discussion of the implications of such data is reserved for the last section of this chapter.

Quarry Analysis Units

An inventory was made of all rocks larger than golf ball size within the 21 four meters square quarry analysis units which were placed in different locales on or near the site area. Table 22 tallies the absolute

TABLE 21

Summary of Interval Level Attributes for All Chipped Stone Artifacts Collected from the Surface at LA 25469

Variable	Dimensions (mm) Minimum	Maximum	Mean
LENGTH	7	143	34.68
WIDTH	7	128	30.68
THICK	1	78	11.15
PLATLENG	0	46	7.12
PLATWID	0	28	3.15

TABLE 20

Summary of Nominal Level Attributes for All Lithic Artifacts Collected from Surface and Test Excavations at LA 25469

Variable				Surface (N=367)		Subsurface (N=351)	
No.	Name	Attributes		Frequency	Percentage	Frequency	Percentage
15	MATERL	1	chert	325	88.6	286	81.5
		2	obsidian	42	11.4	65	18.5
		3	quartzite	0	0.0	0	0.0
		4	igneous	0	0.0	0	0.0
		5	other	0	0.0	0	0.0
16	COLOR1	0	none	0	0.0	0	0.0
		1	white	213	58.0	210	59.8
		2	yellow	17	4.6	15	4.3
		3	red	4	1.1	5	1.4
		4	purple	0	0.0	1	0.3
		5	brown	16	4.4	14	4.0
		6	pink	9	2.5	15	4.3
		7	green or blue	0	0.0	0	0.0
		8	gray	77	21.0	42	12.0
		9	black	31	8.4	49	14.0
17	COLOR2	0	none	270	73.6	259	73.8
		1	white	28	7.6	27	7.7
		2	yellow	17	4.6	14	4.0
		3	red	4	1.1	16	4.6
		4	purple	0	0.0	0	0.0
		5	brown	7	1.9	19	5.4
		6	pink	9	2.5	5	1.4
		7	green or blue	0	0.0	0	0.0
		8	gray	15	4.1	6	1.7
		9	black	17	4.6	5	1.4
18	COLOR3	0	none	320	87.2	340	96.9
		1	white	7	1.9	2	0.6
		2	yellow	4	1.1	1	0.3
		3	red	12	3.3	3	0.9
		4	purple	1	0.3	0	0.0
		5	brown	14	3.8	3	0.9
		6	pink	3	0.8	1	0.3
		7	green or blue	0	0.0	0	0.0
		8	gray	3	0.8	0	0.0
		9	black	3	0.8	1	0.3

TABLE 20
(Cont'd)

Variable				Surface (N=367)		Subsurface (N=351)	
No.	Name	Attributes		Frequency	Percentage	Frequency	Percentage
19	TAXA	0	natural	1	0.3	0	0.0
		1	core	25	6.8	3	0.9
		2	debitage	339	92.4	340	96.9
		3	tool	2	0.5	8	2.3
20	CORETYPE	1	unidirectional	4	16.0	1	33.3
		2	bidirectional	3	12.0	1	33.3
		3	multidirectional	18	72.0	1	33.3
		4	bipolar	0	0.0	0	0.0
		5	other	0	0.0	0	0.0
21	COREUTIL	0	no	22	88.0	3	100.0
		1	yes	3	12.0	0	0.0
22	CORTEX	1	50-100 (primary)	57	16.8	14	4.1
		2	1-50 (secondary)	89	26.3	42	12.4
		3	none (tertiary)	193	56.9	284	83.5
23	PLATPREP	0	none	333	98.2	328	96.5
		1	crushing	4	1.2	11	3.2
		2	grinding	1	0.3	0	0.0
		3	faceting	0	0.0	1	0.3
		4	overhang removal	1	0.3	0	0.0
26	BULB	0	not discernible	152	44.8	149	43.8
		1	salient	46	13.6	37	10.9
		2	diffuse	141	41.6	154	45.3
27	LIP	0	absent	316	93.2	300	88.2
		1	present	23	6.8	40	11.8
28	FLAKTERM	0	indeterminate	69	20.4	62	18.2
		1	feather	181	53.4	143	42.1
		2	hinge	60	17.7	68	20.0
		3	step	29	8.6	67	19.7
		4	outrepasse	0	0.0	0	0.0

TABLE 20
(Cont'd)

Variable				Surface (N=367)		Subsurface (N=351)	
No.	Name	Attributes		Frequency	Percentage	Frequency	Percentage
29	REFLAKE	00	none evident	336	99.1	337	99.1
		11	unif/marginal	2	0.6	3	0.9
		12	unif/end	0	0.0	0	0.0
		21	bifacial/marginal	0	0.0	0	0.0
		22	bifacial/end	0	0.0	0	0.0
		31	combination	1	0.3	0	0.0
30	FLAKUTIL	00	none evident	326	96.2	332	97.6
		11	unif/marginal	6	1.8	2	0.6
		12	unif/end	3	0.9	4	1.2
		21	bifacial/marginal	2	0.6	1	0.3
		22	bifacial/end	0	0.0	1	0.3
		31	combination	2	0.6	0	0.0
31	MARGINS	1	parallel	48	14.2	47	13.8
		2	sub-parallel	77	22.7	85	25.0
		3	divergent	46	13.6	28	8.2
		4	ovate	35	10.3	47	13.8
		5	irregular	133	39.2	133	39.1
32	TOOLTYPE	1	preform	0	0.0	0	0.0
		2	biface	2	100.0	5	62.5
		3	scraper	0	0.0	1	12.5
		4	drill	0	0.0	0	0.0
		5	knife	0	0.0	0	0.0
		6	projectile point	0	0.0	1	12.5
		7	other	0	0.0	1	12.5
33	TOOLOUTL	1	triangular	1	50.0	5	62.5
		2	ovoid	0	0.0	3	37.5
		3	rectangular	0	0.0	0	0.0
		4	square	0	0.0	0	0.0
		5	other	1	50.0	0	0.0
34	XSECT	1	plano-convex	0	0.0	1	12.5
		2	convex	0	0.0	0	0.0
		3	bi-convex	2	100.0	5	62.5
		4	diamond	0	0.0	0	0.0
		5	rectangular	0	0.0	0	0.0
		6	trapezoidal	0	0.0	2	25.0
		7	other	0	0.0	0	0.0

TABLE 20
(Cont'd)

Variable				Surface (N=367)		Subsurface (N=351)	
No.	Name	Attributes		Frequency	Percentage	Frequency	Percentage
35	RETOOL	0	absent	1	50.0	2	25.0
		1	present	1	50.0	6	75.0
36	TOOLUTIL	0	absent	0	0.0	4	50.0
		1	present	2	100.0	4	50.0
37	THERMAL	0	none	360	98.1	325	92.6
		1	crazing	1	0.3	1	0.3
		2	pot lids	2	0.5	4	1.1
		3	waxy luster	0	0.0	16	4.6
		4	crazing + pot lids	0	0.0	1	0.3
		5	crazing + waxy luster	2	0.5	2	0.6
		6	pot lids + waxy luster	2	0.5	2	0.6
		7	crazing + pot lids + waxy luster	0	0.0	0	0.0

TABLE 22

Summary of Attributes for Items Recorded Within Quarry Analysis Units at LA 25469[a]

Quarry Unit	Material			Origin		Condition				Flakability		
	Chert	Quartzite	Other	Cobble	Block	0-1/4	1/4-1/2	1/2-3/4	3/4-1	Low	Medium	High
Q.U.1 (n=80)	51 (63.8)	24 (30.0)	5 (6.2)	24 (30.0)	56 (70.0)	1 (1.2)	16 (20.0)	15 (18.8)	48 (60.0)	4 (5.0)	39 (48.8)	37 (46.2)
Q.U.2 (n=73)	46 (63.0)	16 (21.9)	11 (15.1)	15 (20.5)	58 (79.5)	9 (12.3)	15 (20.5)	9 (12.3)	40 (54.8)	7 (9.6)	34 (46.6)	32 (43.8)
Q.U.3 (n=19)	8 (42.1)	4 (21.1)	7 (36.8)	9 (47.4)	10 (52.6)	1 (5.3)	1 (5.3)	2 (10.5)	15 (78.9)	8 (42.1)	7 (36.8)	4 (21.1)
Q.U.4 (n=29)	4 (13.8)	1 (3.4)	24 (82.8)	18 (62.1)	11 (37.9)	0 (0.0)	10 (34.5)	1 (3.4)	18 (62.1)	23 (79.3)	2 (6.9)	4 (13.8)
Q.U.5 (n=33	8 (24.2)	12 (36.4)	13 (39.4)	27 (81.8)	6 (18.2)	3 (9.1)	7 (21.2)	9 (27.3)	14 (42.4)	15 (45.5)	5 (15.2)	13 (39.4)
Q.U.5A (n=42)	21 (50.0)	8 (19.0)	13 (31.0)	22 (52.4)	20 (47.6)	5 (11.9)	7 (16.7)	9 (21.4)	21 (50.0)	13 (31.0)	5 (11.9)	24 (57.1)
Q.U.6 (n=50)	14 (28.0)	16 (32.0)	20 (40.0)	42 (84.0)	8 (16.0)	1 (2.0)	6 (12.0)	4 (8.0)	39 (78.0)	20 (40.0)	2 (4.0)	28 (56.0)
Q.U.7 (n=10)	3 (30.0)	3 (30.0)	4 (40.0)	7 (70.0)	3 (30.0)	0 (0.0)	2 (20.0)	1 (10.0)	7 (70.0)	4 (40.0)	0 (0.0)	6 (60.0)
Q.U.8 (n=3)	0 (0.0)	0 (0.0)	3 (100.0)	3 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	3 (100.0)	3 (100.0)	0 (0.0)	0 (0.0)
Q.U.9 (n=67)	19 (28.4)	21 (31.3)	27 (40.3)	54 (80.6)	13 (19.4)	3 (4.5)	11 (16.4)	8 (11.9)	45 (67.2)	27 (40.3)	12 (17.9)	28 (41.8)
Q.U.10 (n=53)	11 (20.8)	14 (26.4)	28 (52.8)	45 (84.9)	8 (15.1)	1 (1.9)	5 (9.4)	8 (15.1)	39 (73.6)	27 (50.9)	7 (13.2)	19 (35.8)
Q.U.11 (n=14)	3 (21.4)	1 (7.1)	10 (71.4)	14 (100.0)	0 (0.0)	0 (0.0)	1 (7.1)	1 (7.1)	12 (85.7)	10 (71.4)	0 (0.0)	4 (28.6)
Q.U.12 (n=28)	20 (71.4)	1 (3.6)	7 (25.0)	14 (50.0)	14 (50.0)	2 (7.1)	3 (10.7)	7 (25.0)	16 (57.1)	10 (25.0)	0 (10.7)	4 (28.6)

[a]Percentages in parentheses.

TABLE 22
(Cont'd)

Quarry Unit	Material			Origin		Condition				Flakability		
	Chert	Quartzite	Other	Cobble	Block	0-1/4	1/4-1/2	1/2-3/4	3/4-1	Low	Medium	High
Q.U.13	0	0	2	2	0	0	0	0	2	2	0	0
(n=2)	(0.0)	(0.0)	(100.0)	(100.0)	(0.0)	(0.0)	(0.0)	(0.0)	(100.0)	(100.0)	(0.0)	(0.0)
Q.U.14	7	4	14	16	9	3	6	2	14	14	1	10
(n=25)	(28.0)	(16.0)	(56.0)	(64.0)	(36.0)	(12.0)	(24.0)	(8.0)	(56.0)	(56.0)	(4.0)	(40.0)
Q.U.15	8	13	31	41	11	3	5	2	42	31	3	18
(n=52)	(15.4)	(25.0)	(59.6)	(78.8)	(21.2)	(5.8)	(9.6)	(3.8)	(80.8)	(59.6)	(5.8)	(34.6)
Q.U.16	11	19	11	31	10	1	7	11	22	11	6	24
(n=41)	(26.8)	(46.3)	(26.8)	(75.6)	(24.4)	(2.4)	(17.1)	(26.8)	(53.7)	(26.8)	(14.6)	(58.5)
Q.U.17	23	7	12	19	23	3	6	9	24	12	10	20
(n-42)	(54.8)	(16.7)	(28.6)	(45.2)	(54.8)	(7.1)	(14.3)	(21.4)	(57.1)	(28.6)	(23.8)	(47.6)
Q.U.18	27	38	29	82	12	2	19	16	57	30	18	46
(n=94)	(28.7)	(40.4)	(30.9)	(87.2)	(12.8)	(2.1)	(20.2)	(17.0)	(60.6)	(31.9)	(19.1)	(48.9)
Q.U.19	20	17	20	43	14	3	13	6	35	20	7	30
(n=57)	(35.1)	(29.8)	(35.1)	(75.4)	(24.6)	(5.3)	(22.8)	(10.5)	(61.4)	(35.1)	(12.3)	(52.6)
Q.U.20	10	32	59	101	0	0	11	11	79	59	5	37
(n=101)	(9.9)	(31.7)	(58.4)	(100.0	(0.0)	(0.0)	(10.9)	(10.9)	(78.2)	(58.4)	(5.0)	(36.6)

and relative frequencies of all of these attributes, except color and size, for each quarry unit. The number of inspected rocks within each unit varies from 3 to 101, with a mean of 43.6 rocks/unit. It may be noted that chert does not comprise the greatest percentage of rocks in these units; that position is reserved for the Other category, composed mostly of sandstone and basalt. Approximately two-thirds of the gravels are alluvial cobbles; more than 60 percent are wholly or nearly complete, and a very high percentage are estimated to have high flakability. A multitude of colors - black, gray, brown, green, red, pink, yellow, and white - were observed and the overall size of the rocks varied considerably.

Ceramics

Twenty-six potsherds were found in a small area at LA25469, probably representing a single vessel. Provenience data are presented in Table 23. Representative samples were identified by Curtis F. Schaafsma as evidently belonging to the Dinetah Scored type. Dinetah Scored is an early Navajo utility ware, dating at the earliest A.D. 1690 (Brugge 1982). The sherds are characteristically gray to brown in color, and are thin-walled.

Subsurface Materials

Thirteen test units, each measuring one meter square, were excavated to different depths at LA 25469. Five of these units (R.U.s) were randomly located across the top of the ridge. The other eight units (C.U.s) were placed in locales where surface artifacts were particularly abundant or which exhibited the greatest potential for subsurface materials. The locations of all test units are displayed in Figure 50. Descriptions of each of the excavation units, cultural features, and recovered artifacts are discussed below under individual headings.

Descriptions of Excavation Units

Random Unit 1 - This unit was excavated to approximately 30 cm below PGS (present ground surface). Two natural strata were discerned: Layer 1 (0-10 cm) is a reddish-brown sandy loam containing a number of large rocks; Layer 2 (10-30 cm) is a reddish-brown sandy loam, more compact with a higher clay content, and containing very few rocks. Three flakes were recovered from either Layer 1 or the upper portion of Layer 2.

Random Unit 2 - This unit was excavated to 10 cm below PGS. Two natural strata were defined: Layer 1 (0-5 cm) is a loose, reddish-brown sandy loam with small gravels; Layer 2 (5-10 cm) is similar to Layer 1 except that it is more compact. Two flakes were recovered from the surface.

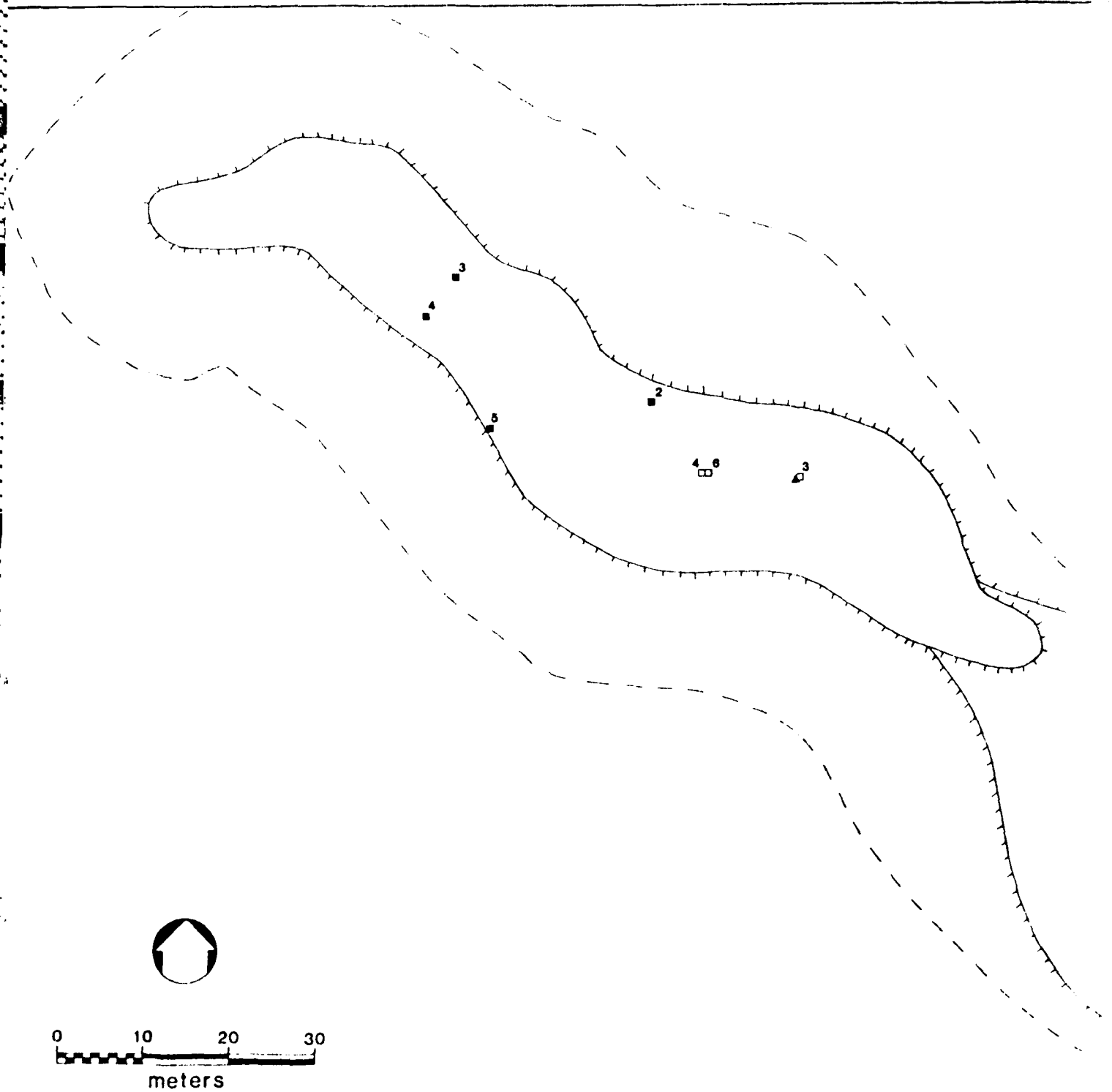
Random Unit 3 - This unit was excavated to 10 cm below PGS. A single natural stratum was defined: Layer 1 (0-10 cm) is extremely gravelly, the medium- and large-sized rocks held together with a compact matrix of reddish-brown sandy silt. No artifacts were recovered.

Random Unit 4 - This unit was excavated to 10 cm below PGS. A single natural stratum was discerned: Layer 1 (0-10 cm) is a light reddish-brown

TABLE 23

Summary of Ceramics Collected from LA 25469

F.S. No.	Surface No.	Excavation Unit	Level	Angle (degrees)	Distance (meters)	Mapping Station	Item
13		C.U. 2	1				22 Dinetah Scored sherds
21	102-D			259	20.5	M.S. 2	2 Dinetah Scored sherds
56		C.U. 5	1				1 Dinetah Scored sherd
82	102-F			259	20.5	M.S. 2	1 Dinetah Scored sherd


3
4
2
5
4
6
3
0
10
20
30
meters

LA25469

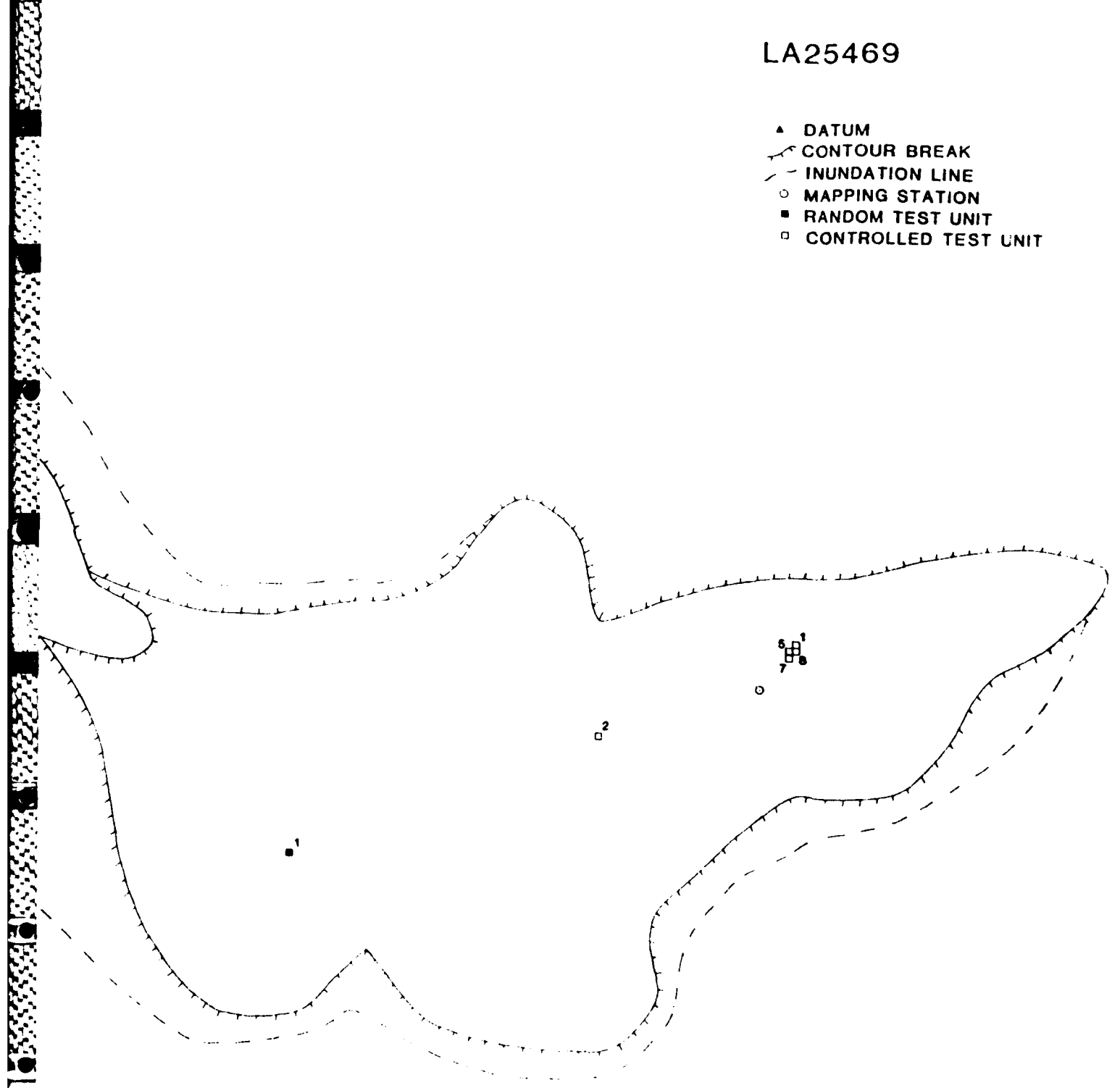


Figure 50. Locations of units at L

sandy soil containing numerous rootlets and small gravels. Two flakes were recovered from the surface.

Random Unit 5 - This unit was excavated to 20 cm below PGS. Two natural strata were discerned: Layer 1 (0-12 cm) consists of a brown sandy silt with small to medium-sized gravels which becomes slightly redder and lighter in color with depth; Layer 2 (12-20 cm) is a very compact layer of gravel interspersed with a reddish-brown sandy silt. Two flakes were recovered from the ground surface.

Controlled Unit 1 - This unit was located near a concentration of chipped stone in surface sample unit 58 and excavated to 30 cm below PGS. A single natural stratum was defined: Layer 1 (0-30 cm) is a homogeneous dark brown silt loam. A total of 84 artifacts, many of them obsidian flakes, was recovered from the unit, mostly from the top 20 cm.

Controlled Unit 2 - This unit was located near surface sample unit 102 with its three pottery fragments and excavated to 12 cm below PGS. Two natural strata were defined: Layer 1 (0-10 cm) is a reddish-brown sandy silt; Layer 2 (10-12 cm) is a compact, yellowish-red sandy silt containing many gravels. Twenty-four artifacts, including 22 pottery sherds and 2 flakes, were recovered from Layer 1.

Controlled Unit 3 - This unit was placed near a concentration of surface artifacts and excavated to 30 cm below PGS. Two natural strata were defined: Layer 1 (0-8 cm) is a loose, light reddish-brown sandy silt; Layer 2 (8-30 cm) is a compact, reddish-brown sandy silt containing gravels which are concentrated in the north half of the unit and increase in quantity with depth. Thirteen artifacts were recovered: 12 flakes from Layer 1 and 1 flake from Layer 2.

Controlled Unit 4 - This unit was placed near a concentration of surface artifacts and excavated to 20 cm below PGS. Two natural strata were defined: Layer 1 (0-6 cm) is a reddish-brown sandy silt containing a few small gravels; Layer 2 (6-20 cm) is a dark gray, charcoal-stained sandy silt containing a large number of rocks, many of which appear to be fire-blackened. Despite the charcoal-stained soil and the blackened rocks, no definite cultural features were observed. Three fire-cracked rock fragments were recorded on the surface and 3 artifacts were recovered from Layer 1.

Controlled Unit 5 - This unit was established in a dense concentration of chipped stone near C.U. 1 and excavated to approximately 30 cm below PGS. Three natural strata were discerned: Layer 1 (0-10 cm) is a loose, light reddish-brown sandy loam; Layer 2 (10-20 cm) is a more compact, reddish-brown sandy loam; Layer 3 (20-30 cm) is a compact reddish-brown sandy loam containing a sizable number of small gravels. A total of 97 artifacts was recovered from the unit: 4 flakes from the surface, 45 flakes and 1 pottery sherd from Layer 1, 26 flakes from Layer 2, and 21 flakes from Layer 3. The assemblage in Layer 3 included one obsidian projectile point.

Controlled Unit 6 - This unit was placed adjacent to the east wall of C.U. 4 and excavated to 20 cm below PGS. Like C.U. 4, two natural strata were defined: Layer 1 (0-6 cm) is a reddish-brown sandy silt with

a few small gravels; Layer 2 (6-20 cm) is a dark gray, charcoal-stained sandy silt containing a larger number of gravels, some of which appear to have been fire-blackened. Layer 2 pinches out approximately halfway across the test unit, with Layer 1 filling the remainder of the unit. No obvious cultural features were discerned, the charcoal-stained soil and blackened rocks are thought to represent the remnants of a tree burn, or a similar event. No artifacts were recovered.

Controlled Unit 7 - This unit was located in a dense concentration of chipped stone, its north wall adjoining the south wall of C.U. 5, and excavated to 20 cm below PGS. Two natural strata were discerned: Layer 1 (0-6 cm) is a loose, dark reddish-brown sandy silt with only a few rocks; Layer 2 (6-20 cm) is a compact reddish-brown sandy silt containing some gravels on the south side of the unit. A semi-circular pattern of dark soil which had been excavated into Layer 2 was observed in the north half of the unit; it is believed to be cultural in origins but its function was not determinable. Seventy-eight artifacts were recovered: 1 from the surface, 31 from Layer 1, and 46 from Layer 2, most of the latter coming from the supposed feature.

Controlled Unit 8 - This unit was placed adjacent to the east wall of C.U. 5 and the south wall of C.U. 1 so as to further define the possi- feature exposed in C.U. 7; it was excavated to approximately 30 cm in the east half of the unit and to 50 cm in the west half. Three natural strata were defined: Layer 1 (0-10 cm) is a loose, dark reddish-brown sandy silt containing a few small gravels; Layer 2 (10-20 cm) is a compact brown sandy loam with a few rocks; Layer 3 (20-30 cm and 20-50 cm) is a very compact light reddish-brown sandy clay loam containing numerous gravels and rocks. A total of 147 artifacts was recovered: 13 flakes from the surface (including 10 which were retrieved from the 1/16" mesh screen), 45 flakes from Layer 1, 34 flakes from Layer 2, and 55 flakes from Layer 3. The cultural strata continue to a depth of 32 cm. Further definition of the possible feature exposed in C.U. 7 could not be made; its origins and function remain problematic.

It would seem from the above descriptions that the natural deposits on LA 25469 are relatively undifferentiated. They consist basically of brown or reddish-brown sandy silt which increases in compaction, and contains increasingly greater numbers of gravels and rocks, with depth. The soil on the east half is slightly deeper than those on the west half. Cultural deposits are generally shallow; most artifacts were found within the top 10-20 cm. The six test units on the east half of the site contained approximately 95 percent of the total number of recovered artifacts, each unit yielding an average of 72 artifacts. In contrast, the west half is characterized by a mean of 3.6 artifacts/unit. This difference could partially be attributed to natural transformation processes, i.e., slope wash may have carried artifacts down from the higher west half to the east half. The great number of subsurface artifacts recovered from the test units placed near the east end of the east half, and the presence of a possible cultural feature, suggests that cultural practices may partially account for the differences. The implications of the latter statement are further explored in the last section of this chapter. Pertinent to this topic is the composition of the subsurface artifactual assemblage, described in the next section.

Artifact Assemblage

A total of 598 artifacts (575 chipped stone items and 23 pieces of pottery) was recovered from 11 of the 13 test units. All ceramics were found in two test units on the east half of the site: 22 sherds from the top level of C.U. 2 and 1 sherd from the top level of C.U. 5. These sherds were all Dinetah Scored.

All chipped stone artifacts were described and measured in the same manner as were the collected surface artifacts. Table 20 presents the absolute and relative frequencies of artifacts for each of the 21 nominal level attributes. Nearly 97 percent of this assemblage consists of debitage, the remaining artifacts comprise 3 cores and 8 prepared tools. Chert artifacts are predominant, but frequencies are not quite as high as for the surface artifacts; a modest increase in obsidian frequency accounts for the difference. Material colors are mostly white, with minor amounts of gray, black, yellow, pink, and brown. Debitage tertiary flakes are much more numerous, accounting for more than 83 percent of the total items; secondary and primary flakes are substantially less numerous. Subsurface artifacts are generally about half as big as those on the surface. The ranges and mean values of the subsurface artifacts on the five interval level variables are given in Table 24.

TABLE 24

Summary of Interval Level Attributes for All Chipped Stone Artifacts Collected from Test Excavations at LA 25469

Variable	Dimensions (mm) Minimum	Maximum	Mean
LENGTH	4	89	20.31
WIDTH	1	85	18.13
THICK	1	43	4.89
PLATLENG	0	54	4.15
PLATWID	0	23	1.67

Comparing Tables 19 and 24, it would appear that the smaller by-products of lithic tool manufacture, those which represent the final stages of tool production, are most likely to be found where the disturb processes of natural erosion are minimized, i.e., below the ground surface. It is not possible to say, however, how many of these subsurface artifacts were moved around before becoming buried but it can be surmised that such movement probably has occurred. The high frequency

of subsurface artifacts in the east half test units is probably due to the combination of natural processes, e.g., slope wash, and cultural activities.

As Table 20 indicates, 8 prepared tools were recovered from the test excavations. These tools consist of 5 bifaces, 1 scraper, 1 projectile point, and 1 uncategorized artifact. Figure 49 illustrates five of these tools, including the projectile point, three bifaces (two fragments which are joined to form a single artifact), and the scraper. The exact locations and metric measurements of each of these collected tools are given in Appendix B. Specimen F.S. 59 (Fig. 49a) is a small triangular shaped obsidian projectile point with narrow side notches, convex base, shallow basal notch, straight blade margins, and a bi-convex (lenticular) profile. It is finely flaked on both faces and is missing the extreme tip portion. It was recovered from Layer 3 (20-30 cm below PBS) of C.U. 5.

Obsidian Hydration and Trace Elements Analysis

A relatively small number of obsidian artifacts were recovered from the surface sample units and the test excavations. Despite their low numbers, these artifacts were used to supply chronometric dates for the occupation of LA 25469 and pinpoint the most likely source(s) of this obsidian, and thereby provide information on the parameters of lithic raw materials procurement and processing.

A sample of 16 obsidian artifacts were submitted to Fred Trembour of the Branch of Isotope Geology, U.S. Geological Survey in Denver for hydration testing. Table 25 presents the results of this analysis, giving the refractive index, hydration thickness, the hydration rate, and the estimated hydration age for each artifact. The estimated mean site temperature of 12.6° C., used to calculate the intrinsic hydration rates of refractive index groups, was obtained by reference to published records of the Abiquiu Dam and Alamos weather stations (F. Trembour, personal communication 1983). The estimated hydration ages and their accuracy range (± 6%) have been plotted in Figure 51.

Upon completion of the hydration analysis, the same samples were submitted to A & G Analyses of Provo, Utah, for analysis of chemical composition. Table 26 presents the results of this chemical analysis and identifies, in the last column, the probable geologic source area(s) for the samples. All of the samples originated at one of two sources; source A specimens were evidently obtained at Polvadera Peak, and source B specimens are thought to have emanated at Cerro del Medio in the Jemez Mountains of Sandoval County (Fred Nelson, personal communication).

Pollen Analysis

A group of soil samples was collected from one wall of C.U. 8, at intervals of 5 cm from the surface to 30 cm below PGS; a complementary specimen was taken from the modern ground surface. The samples were submitted to Palynological Analysts of Montrose. The results are described in a separate report by Linda Scott, included here as Appendix A.

TABLE 25

Results of Obsidian Hydration Analysis
on Samples Collected from LA 25469
Abiquiu Reservoir Area

F.S. No.	Provenience Location	Depth	Refractive Index	Hydration $(\mu m)^2$	Hydration Rate at 12.6°C $(\mu m)^2/10^3$ years	Hydration Age, Yrs. BP
20	58L	Surface	1.484	22.4	5.4	4100
20	58A	Surface	1.483	15.5	6.7	2300
55	C.U.5	0-10 cm	1.484	8.2	5.4	1500
57	C.U.5	20-30 cm	1.483	8.1	6.7	1200
58	C.U.5	20-30 cm	1.483	5.1	6.7	750
63	C.U.7	10-20 cm	1.483	7.5	6.7	1100
63	C.U.7	10-20 cm	1.484	8.0	5.4	1500
68	C.U.8	0-10 cm	1.483	17.9	6.7	2700
69	C.U.7	0-10 cm	1.483	18.2	6.7	2700
70	C.U.8	10-20 cm	1.483	8.6	6.7	1300
71	C.U.8	20-30 cm	1.483	6.5	5.4	1200
71	C.U.8	20-30 cm	1.483	6.1	6.7	900
71	C.U.8	20-30 cm	1.484	7.7	5.4	1400
73	C.U.1	0-10 cm	1.484	19.3	5.4	3600
74	C.U.1	10-20 cm	1.484	17.5	5.4	3200
75	C.U.1	20-30 cm	1.483	8.0	6.7	1200

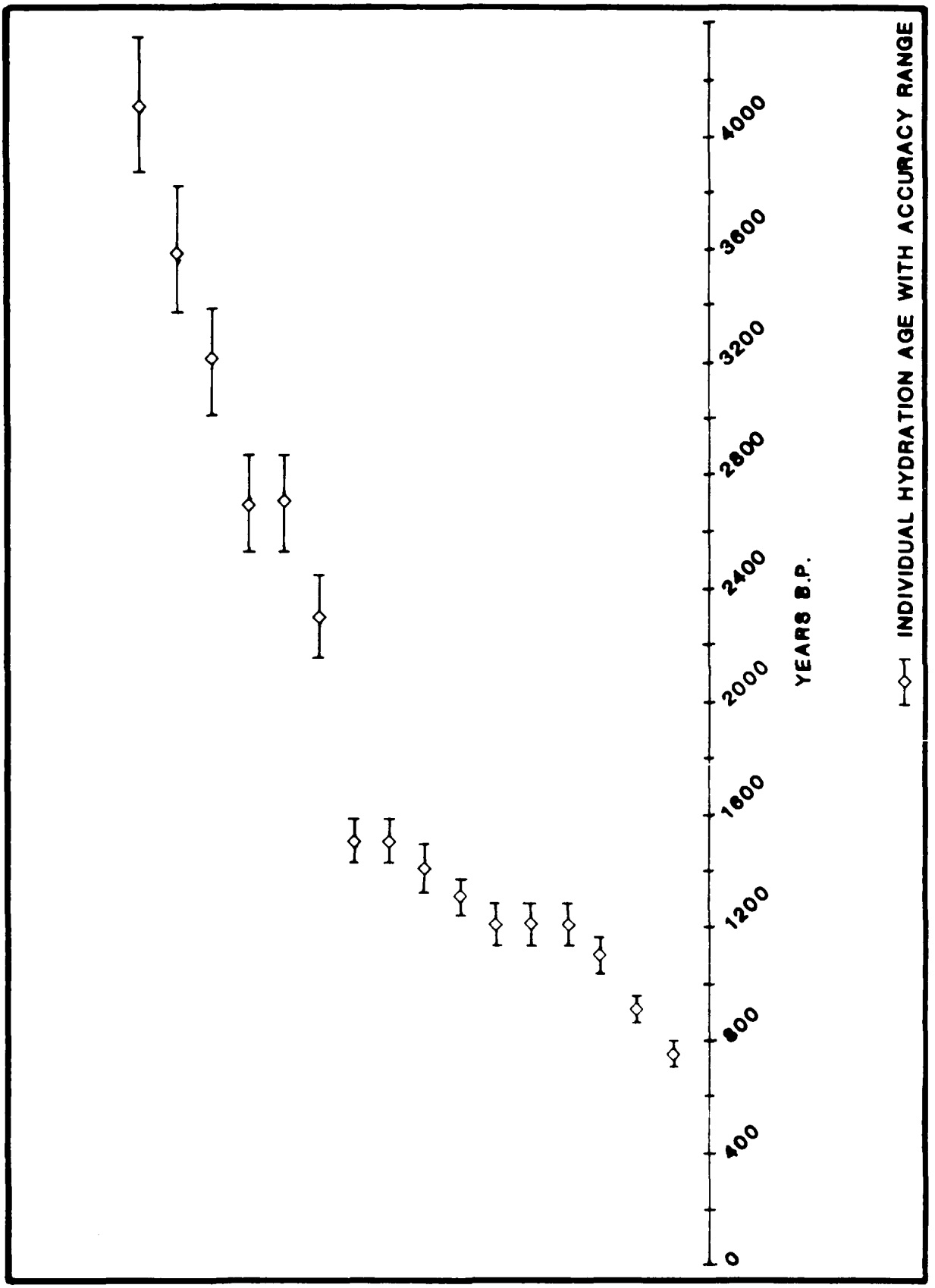


Figure 51. Hydration ages for sample of obsidian artifacts collected from LA25469.

TABLE 26

Results of Analysis of Chemical Composition for Sample of Obsidian Artifacts Collected from LA 25469

Sample No.	Provenience	Hydration Analysis I.D. No.	Chemical Composition Rb ppm	Sr ppm	Y ppm	Zr ppm	Nb ppm	MnO %	Fe O %	T O %	Ba ppm	Na O %	Obsidian Source
1275	FS20	N6A 30	147.0	9.4	26.7	106.9	56.5	.066	.56	.088	21.5	4.70	A
1276	FS20	N6A 29	153.5	7.0	55.6	209.1	69.9	.066	1.24	.103	41.5	4.84	B
1277	FS55	N6A 25	150.0	11.3	49.8	203.5	69.8	.062	1.23	.104	34.8	4.86	B
1278	FS57	N6A 32	149.2	9.0	24.7	108.2	61.0	.066	.53	.087	19.0	4.66	A
1279	FS58	N6A 31	148.1	7.7	26.5	109.0	58.2	.066	.52	.087	19.7	4.59	A
1280	FS63	N6A 23	147.2	10.2	22.4	105.4	56.4	.066	.54	.087	18.8	4.75	A
1281	FS63	N6A 24	151.5	5.4	56.9	212.3	71.6	.062	1.21	.102	35.7	4.81	B
1282	FS68	N6A 20	146.8	6.9	28.7	108.9	60.8	.066	.53	.090	20.7	4.72	A
1283	FS69	N6A 26	144.6	6.7	29.6	119.5	60.5	.066	.60	.088	18.4	4.62	A
1284	FS70	N6A 21	145.3	8.1	27.6	108.3	55.6	.066	.54	.091	19.1	4.76	A
1285	FS71	N6A 33	158.6	9.3	44.1	200.2	62.8	.063	1.38	.103	33.4	4.88	B
1286	FS71	N6A 34	147.3	5.8	29.9	113.3	58.2	.066	.62	.088	18.8	4.64	A
1287	FS711	N6A 35	157.0	8.1	53.4	212.6	71.4	.062	1.23	.101	36.2	4.82	B
1288	FS73	N6A 27	153.9	5.1	54.2	208.9	69.2	.068	1.25	.110	43.2	4.69	B
1289	FS74	N6A 28	156.1	11.6	38.3	192.7	60.1	.061	1.23	.102	33.0	4.94	B
1290	FS75	N6A 22	148.5	11.2	18.8	102.6	54.4	.066	.61	.089	20.9	4.73	A

ppm = parts per million

Interpretation of Results

The principal focus of the preceding discussion has been upon describing the cultural data gathered from LA 25469 and the methodological procedures which were used to recover these data. To synthesize this information so that a greater understanding of the cultural activities which took place at this locality may be attained, paleoenvironmental conditions, chronology, site function, and subsistence are considered.

Paleoenvironment

Information on local paleoenvironmental conditions is derived from the analysis of the pollen contained within the natural deposits of the site. The conclusions of Scott's report are summarized here.

Modern vegetation in the area is dominated by the pinyon/juniper community. On-site vegetation at LA 25469 consists of scattered pinyon and juniper trees, sagebrush, rabbitbrush, snakeweed, cholla cactus, and several varieties of grasses; cottonwood trees grow alongside the Rio Puerco. The pollen record obtained from C.U. 8 is nearly identical in its characteristics with the record from LA 25454, a result which is not unexpected given the proximity of the two sites. The samples from both sites reflect a vegetational pattern which is relatively stable for at least 1000 years. This pattern included a pinyon/juniper woodland with an understory of Cheno-ams and grasses; sagebrush appears to have been more common in the past than today. The clearance of native woodlands in the recent past for grazing has caused a concomitant reduction in the understory and shrub vegetation (particularly the Cheno-ams) throughout the area.

The stability of the local vegetation suggests that meteorological conditions may also have been relatively stable. Elimination of the native woodlands in the historic past, and the construction of the Abiquiu Dam and consequent inundation of large areas, has disrupted this stable pattern.

Chronology

Two sources of information are considered for dating the site occupation: artifactual typology and obsidian hydration. Potentially datable artifacts recovered from the site include one obsidian projectile point and 26 pottery sherds. The projectile point (F.S. 59; Fig. 49a) is a small, triangular-shaped obsidian implement exhibiting narrow side notches, a convex base, and a shallow basal notch. It is similar to arrowpoints found at Pueblo III and later Pueblo sites in the Rio Grande Valley and the eastern Colorado Plateau. According to Schaafsma (1976: 152), such points are "generally small, triangular shaped overall and are well made by pressure flaking, have side notches about one-third of the way up the blade, and the bases are straight or slightly convex with the base wider than the blade." Eleven of these Puebloan arrowpoints were found by the School of American Research in the Abiquiu Reservoir area, their occurrence documenting the presence of Pueblo people in the area, "probably as hunting parties from the Biana and Palisade village near the (Abiquiu) dam." (Schaafsma 1976:152). Assuming this typologi-

cal identification is correct, one occupation of LA 25469 may have occurred sometime during the period A.D. 1100-1300. The ceramics, identified as Dinetah Scored, apparently indicate a Navajo occupation at the site following A.D. 1690.

These few artifacts suggest, therefore, the site could have been occupied between A.D. 600-900 and A.D. 1700. Lacking materials which can be dated chronometrically, a researcher is often prevented from attaining precision greater than this. It was hoped that this problem could be partially or wholly alleviated by collecting a few obsidian artifacts from LA 25469 for hydration analysis. The results of this procedure, tabulated in Table 26 and plotted graphically in Figure 51, reveal a pattern of ages which span a period of more than 3300 years, from 4100 to 750 years B.P. A moderately tight cluster of ages is evident at the more recent end of the scale, five of these ages overlapping at approximately 1200 years (A.D. 783). Separating these younger dates from a loosely clustered group of six older dates is a temporal gap of at least 500 years. A literal interpretation of the hydration data suggests the occurrence of two occupational periods, early and late. More confidence can be placed, however, in the late group of ages given their tighter clustering.

Combining the results of all chronological techniques, it is cautiously concluded that at least one occupation of LA 25469 took place at approximately A.D. 800. This date and the characteristic artifacts suggest that the site was visited by Puebloan groups originating at one of the few villages in the region. The few Dinetah Scored sherds indicate a Navajo occupation in the eighteenth century or later.

Site Function

LA 25469 was recorded as an aboriginal lithic quarry where lithic raw materials were procured, or to which they were carried from some other locality, and reduced either to a finished tool or a roughed out implement which would be finished at another locale. Investigations at the site were designed to evaluate the validity of this site function or to determine the purpose and function of the site.

Chapter IV includes a discussion on the attributes of a lithic quarry and how those attributes might be recognized in the archaeological record. A distinction has been made between quarry and other localities where lithic raw materials may be obtained: the term quarry should be reserved for those places where an exploitable source of raw material is exposed, e.g., bedrock outcrops. Gravel deposits could fit this definition but it is more appropriate to consider them as a separate phenomenon. Since the purpose for exploiting both localities is similar but the technology used to obtain raw materials may differ, a distinction between these two localities is made. "Quarry" is used to describe sites located on or near bedrock exposures; "primary lithic reduction center" indicates sites near gravel deposits.

Quarries and primary lithic reduction centers are alike in one important characteristic: raw materials were being gathered and wholly or partially reduced to a finished tool. The numbers and kinds of artifac-

tual classes present in the site assemblage can provide clues on how and to what what extent raw materials were being reduced. In his study of paleolithic handaxes, Newcomer (1971) has suggested a relationship between the stages in the manufacture of such tools and the characteristics exhibited of the waste flakes.

The large number of chipped stone artifacts which occur at LA25469 indicate that the manufacture of lithic tools was the principal activity performed. This study focused on manufacturing techniques revealed by the debitage.

The predominant raw material used for artifacts found at LA 25469 is chert. Most of this chert is either white or gray; white is most abundant, usually flecked with yellow, brown, red, or black spots. It is massive and fractures conchoidally. This description closely fits that of a local variety called Pedernal chert, a member of the Tertiary Abiquiu Formation. The chert horizon outcrops in scattered localities around, and to the west of, Cerro Pedernal. The latter is a prominent regional landmark, located approximately 7 miles (11 km.) south of LA 25469. Its proximity suggests the possibility that aboriginal groups were journeying to its flanks, removing pieces of chert from the outcrop(s), reducing those pieces to a transportable form, and finishing them at a secondary locality, e.g., LA 25469. One does not need to travel to Cerro Pedernal for chert since many of the streams and rivers in the area have carried pieces of chert and other rocks to lower elevations; the Rio Puerco is one such drainage flowing directly by the site.

It seems more reasonable to suppose, therefore, that local aboriginal groups were exploiting the chert cobbles and boulders contained in the gravels alongside the Rio Puerco or on the adjacent alluvial terraces. The large numbers of chert contained in the quarry analysis units certainly seems to support such a proposition. The locality is easily reached by groups traveling along the Chama River drainage and little effort is required to gather the raw materials. It is possible that the materials obtained from the local gravel deposits were augmented by specimens obtained from the outcrops on or near Cerro Pedernal: the angular blocks of chert recorded in the quarry analysis units may have originated in the latter locale.

The few obsidian artifacts recorded on the site offer additional support for the latter proposition. Chemical analysis has determined that the obsidian present at LA 25469 originated at one of two sources in the Jemez Mountain area, south of the site. Possibly, Cerro Pedernal was included in an excursion to gather chert.

Once the raw material (chert and obsidian) was obtained, it was carried to the site area and reduced to a usable implement. How it was reduced can partially be answered by examination of the by-products of the reduction process, waste flakes.

Most of the debitage is generally characterized by the following attributes: little or no cortex, i.e., tertiary flakes; very little platform preparation; diffuse bulb of percussion on those items for which a bulb could be discerned; edges which terminate in feather fractures; and

no proximal-ventral lip. Considering all of these attributes, the artifacts appear to represent the second stage of tool manufacture in which the roughouts are thinned and shaped; some final finishing may also have taken place. Flaking with a soft hammer seems to have been the preferred percussion technique since the greater percentage of the flakes exhibit a diffuse bulb of percussion. This interpretation must be tempered because fewer flakes possess a proximal-ventral lip, a characteristic usually associated with soft hammer flaking. The data suggest, however, that this discrepancy might be attributed to provenience: buried flakes, protected from much of the erosional processes to which the surface artifacts are subjected, are more likely to retain this lip. Their absence may also be a commentary on the accuracy of Newcomer's criteria for determining the percussion technique; such criteria may not be applicable under all conditions irrespective of time and place.

Considering morphological characteristics, the buried artifacts are remarkably similar to those collected from the surface; however, some differences do exist. Besides having more flakes with proximal-ventral lips, the subsurface debitage contains more tertiary flakes and few secondary or primary flakes. These flakes exhibit slightly more platform preparation, have fewer feather and more hinge and step fractures, and contain more evidence of thermal treatment. From these comparisons, relative uniformity may be detected in the way lithic raw materials were reduced to finished implements during occupation. Differences in the composition of the artifactual assemblage is probably attributable to natural processes of erosion and deposition which randomly disperse and pool certain sizes and kinds of artifacts.

Some patterns are apparent in the spatial distribution of artifacts across the ridgetop. The site map reveals two clusters of artifacts on the west half of the ridge, one at either end of this section. In the eastern half, even though the area was only sampled, there appears to be a tendency for more artifacts to be located at the eastern end of this section. One behavioral interpretation is that these spots represent aesthetically pleasing places to sit for an extended period of time and "break up rock."

Subsistence

Information on the subsistence practices of the site occupants is scanty; no animal bone, charcoal, or charred plant parts were found to provide evidence of prehistoric diet. Absence of data is attributable to the temporary nature of the occupation. A projectile point provides the only evidence, albeit indirect, on subsistence. This artifact suggests that the site occupants had participated in the procurement of local fauna; some other lithic artifacts could be implements used to butcher an animal. It is also possible that the site visitors may have exploited local vegetation, if only on a fortuitous basis.

CHAPTER VII

INTER-SITE INTERPRETATIONS AND DISCUSSION

The previous four chapters described the results of investigations at each of the four archaeological sites. In this chapter, a better understanding of human adaptation is achieved through comparing and contrasting these results in the Abiquiu Reservoir area. The first section critically examines the patterns of local lithic raw material procurement and processing, in the chipped stone assemblages at each site. Second, inundation by Abiquiu Reservoir of large portions of two sites offers the opportunity to explore its effects upon the distribution of artifacts. Conclusions derived should be apropos for other sites throughout the area which might be affected by flooding. Finally, various lines of evidence describe the long term adaptive strategies of resident populations.

Exploitation of Raw Lithic Materials in the Abiquiu Reservoir Area

Lithics, or chipped stone, were important if not predominant elements in the artifactual assemblages of the four sites investigated during this project. The assemblages of LA 25454 and LA 25469 are composed almost completely of lithic materials. The absolute frequencies of lithics are lower at LA 25322 and LA 25466 but they still are present in relative abundance; only at LA 25466 are lithics outnumbered by other artifacts - ceramics and historic materials. Given its predominance, a brief examination is presented of the parameters of lithic raw material exploitation for this area.

Site LA 25454 and LA 25469 have been described and recorded as lithic quarries, localities where raw materials are reduced wholly or partially to finished tools. As stated elsewhere in this report, it is believed that this terminology obscures important aspects of the process of lithic raw material procurement and processing. The term quarry for those sites located on or near an outcrop of usable rock and for which direct evidence exists that this outcrop had been exploited by aboriginal peoples. Quarrying requires special tools and a unique technology to extract the raw materials. Overlying soil cover may need to be removed and suitable digging implements are necessary. If not naturally fragmented, fractures in the rock must be induced artificially, possibly through the combined effects of fire and water. Prying tools can then be inserted into the cracks to dislodge rock fragments. Finally, these rock fragments are reduced to a size which would allow easy transport to a base camp. Performance of these activities should result in the formation of a unique concentration of materials around the rock outcrop(s): fragments of unused (flawed) rock, large number of cortical flakes, generally large flake size, and possibly a few unintentionally broken roughouts or preforms; finished tools should be nearly or wholly absent.

Another important source of lithic raw materials are gravel deposits found in stream channels or on alluvial terraces. Such deposits can contain boulders and cobbles of exploitable raw materials if the drainages which formed these deposits originate near, or flow by, an outcrop. The

process of exploiting such gravels differs somewhat than for quarries. Special tools and technologies are usually unnecessary. Once obtained, the cobbles could be carried to a nearby locale to be shaped into a preliminary or advanced form of a tool. Given these differences, localities where alluvial gravels were being processed should be referred to as primary lithic reduction centers, to distinguish them from quarry sites. One possible disadvantage of exploiting gravel is that stream transport may have induced flaws in the stone and affected its flakability. Suitability testing by fracturing the rock once or twice, could have determined those to be kept or discarded. Any suitability testing conducted on the terrace tops would have left behind by-products such as angular fragments of stone, large cortical flakes, and cores with only a few flake scars. These items probably would have been carried away, or severely eroded, by the stream had this testing taken place in the drainage channel.

Both LA 25454 and LA 25469 are located on alluvial terraces and contain substantial numbers of lithic artifacts which are either scattered across the terraces or were found in subsurface deposits; there were 1,399 artifacts from LA 25454 and 2,482 from LA 25469. The overwhelming majority (90 percent average) of artifacts recorded at these sites are manufactured from chert. Chert is slightly more abundant at LA 25469 (94 percent of the total assemblage) than it is at LA 25454 (86 percent). The discrepancy is accounted for by the greater relative frequency of obsidian at LA 25454 (11 percent) than at LA 25469 (4 percent). The remaining artifacts are made of various materials, mostly quartzite. The chert source is undoubtedly a horizon which outcrops on and around Cerro Pedernal, located approximately 10 km. south of the two sites. Cerro Pedernal is the only known source in the area from which chert of a quality suitable for lithic tool manufacture can be obtained. Did the chert originate at the outcrop or was it gathered from the gravel deposits along Jaspe Arroyo and the Rio Puerco which head near Cerro Pedernal and subsequently flow by LA 25454 and LA 25469, respectively?

A partial answer may be found by examining data gathered from the quarry analysis units. Inventorying rocks contained within those units was performed to determine their suitability for lithic tools. Comparing inventory results from the two sites demonstrated that at LA 25454 the majority of the materials contained within the quarry units are sandstone and basalt; quartzite is slightly less abundant but still makes a significant percentage of the materials. Also, chert is distinctly under-represented, contributing slightly more than 4 percent of the assemblage. In contrast, the frequencies of chert, quartzite, and other (sandstone and basalt) at LA 25469 are more evenly distributed. The relative frequency of chert is second to the sandstone and basalt; quartzite is the least abundant. At LA 25469 the majority of the rocks (43.9 percent) have high flakability. At LA 25454, however, slightly more than 5 percent of the materials have high flakability. The latter result is a consequence of the abundance of chert on this site relative to the other materials, chert being generally more workable than quartzite, sandstone, or basalt.

These results suggest that despite their general similarities, LA

25454 and LA 25469 are distinct in one important aspect, raw material procurement practices. Whereas the occupants of LA 25469 probably gathered most if not all of their chert from nearby gravel deposits, the inhabitants of LA 25454 seemed to have relied less upon local gravels inasmuch as chert is comparatively scarce in these deposits. If they could not rely upon nearby gravels, they must have traveled to Cerro Pedernal, as evidenced by the site's artifactual assemblage. As mentioned above, obsidian is present in slightly greater quantities at LA 25454 and, since it is not available on the site or in the very near vicinity, special trips would have had to have been made to gather this highly desirable material. The nearest known sources of obsidian are in the Jemez Mountain area south of the site. Given spatial relationships, supplies of obsidian and chert could have been gathered at the same time. Parties might have traveled first to Polvadera Peak or some other nearby source(s) to obtain obsidian and then stopped for chert at Cerro Pedernal on the return trip.

A detailed study of regional raw material procurement practices cannot be attempted here, but one partial explanation of the apparent differences between LA 25454 and LA 25469 is in their sources of raw material. Assuming that where raw materials are abundant and easily obtained, less attention would be paid to how much material is wasted. The archaeological consequences of this assumption are: (1) flakes with smaller working edges, and (2) a greater abundance of cortical flakes. The complementary assumption is that where natural materials are scarce or must be transported great distances to a site, more efficient use of individual pieces will be made. Other consequences are: (1) flakes with a greater amount of working edge, and (2) fewer cortical flakes and more finishing flakes.

Examining the data in the preceding sections, it was found that LA 25469 has a greater number of primary flakes (flakes with between 50% and 100% cortex on one surface) than does LA 25454: 13.3 percent vs. 8.2 percent, respectively. In addition, LA 25454 has slightly more tertiary flakes (70.4 percent) than does LA 25469 (68.5 percent). Efficiency in flake production can be measured by the total amount of usable working edge produced, this value reflected in the length/width ratio; that is, long, narrow flakes contain a greater amount of usable working edge and represent a more efficient use of the raw material. The length/width ratios of flakes from LA 25454 and LA 25469 are 1.18 and 1.13, respectively.

While the differences are not overwhelming, they do seem to substantiate that raw material procurement practices differed at the two sites: the occupants of LA 25469 had an abundant supply of knappable chert available for their use in the nearby gravel deposits; however, such items were less abundant in the vicinity of LA 25454, this scarcity requiring the site inhabitants to travel greater distances to obtain their raw materials. These differences in procurement practices had other consequences as well: the presence of a cultural feature, groundstone, and greater number of lithic tools suggests that LA 25454 may have been occupied for greater periods of time than was LA 25469 which lacked or was deficient in such manifestations. It would seem, therefore, that LA 25454 may have been a base camp where a multitude

of activities took place, including temporary habitation, lithic manufacture, hunting, and possibly plant gathering and/or processing. The essential purpose of the occupation of LA 25469, on the other hand, appears to have been lithic raw material collection and reduction. Despite the differences, both sites are labeled as primary lithic reduction centers.

Compared to the two sites discussed above, the lithic assemblages at LA 25322 and LA 25466 are minuscule. The total number of chipped stone artifacts recorded at LA 25322 is 81, 72 (89 percent) which consist of utilized flakes and debitage; the remainder are prepared tools. Slightly more than twice as many as lithic artifacts were recorded at LA 25466, 97 percent of which are utilized flakes and debitage; prepared tools comprise the remainder. Given the different cultural affiliations and ages of these two sites (LA 25322 probably was occupied by Navajo peoples between ca. A.D. 1600 and 1750, while LA 25466 is a Euro-American farmstead occupied between A.D. 1880 and 1925), it is expected the composition of their lithic assemblages, and the manner(s) in which those were gathered, to differ somewhat from the primary lithic reduction sites.

Nearly all of the lithic materials at LA 25322 are chert, the exception being three obsidian flakes. Macroscopic characteristics of this chert are similar to those which originate at Cerro Pedernal. It would appear that large and slightly reduced raw materials were carried to the site for final finishing since tertiary flakes dominate the assemblage (64 percent), followed by secondary (24 percent) and primary (13 percent) flakes. The raw materials were not gathered and initially reduced on the site; they probably originate at any one or more of the gravel deposits containing Pedernal chert which occur throughout the Abiquiu Reservoir area. Hydration dating of a sample of obsidian artifacts produced such equivocal results that little reliance can be placed in those dates. Cross-dating with a very small collection of typable pottery sherds suggests an occupational component dating sometime between the mid-seventeenth to early twentieth century.

The lithic assemblage at LA 25466 is more than twice as large (190 artifacts) than that at LA 25322. Despite the size differences, the lithic assemblage at LA 25466 is virtually indistinguishable from LA 25322. Most artifacts were chert, with a very small percentage of obsidian. Non-utilized debitage outnumbers all other artifact types (utilized flakes, cores, biface, scraper, and drill), and this debitage is predominated by tertiary flakes, secondary and primary flakes present. Like LA 25322, the origin of the chert artifacts at LA 25466 probably is one or more of the local gravel deposits. Unlike its counterpart, however, LA 25466 contains a relatively greater number of obsidian artifacts. This fact distinguishes the two sites in their raw material procurement practices. LA 25466 is additionally unique in that it contains structural remains, numerous features, and artifacts of historic vintage, i.e., nineteenth to early twentieth century, and Euro-American (Hispanic) heritage is suggested by the fireplace. A dual occupation of the site area is suggested by the juxtaposition of the historic remains and the aboriginal artifacts (ceramics and chipped stone). However, the possibility that the lithic items may have been produced and utilized by the Hispanic occupants cannot be ruled out.

A solution to this latter problem, which has immediate bearing with regard to lithic exploitation practices, can tentatively be advanced based upon an examination of the chipped stone assemblages at all four sites. A few lithic artifacts have traditionally been used by archaeologists to define the cultural and temporal affiliations of a site's occupants, i.e., projectile points. It is also possible that the cultural identity of an occupation might be ascertained through an examination of less exotic, more mundane artifacts such as debitage. Potential for such identification is good, the major problem being the isolation of those attribute(s) which best reflect idiosyncratic practices of stone tool production. Certain dimensions of an individual flake may be reliable indicators of flake production efficiency. That is, certain groups may have been more careful, and skillful in core preparation for flake detachment and in obtaining the greatest amount of usable working edge with the least amount of effort.

Two measures of this technological skill are the ratios of platform length/platform width (L_p/W_p) and total length/total width (L_t/W_t), respectively. These two ratios are compared below for the four sites.

	L_t/W_t	L_p/W_p
LA 25322	1.07	2.47
LA 25454	1.18	2.28
LA 25466	1.09	2.75
LA 25469	1.13	2.33

Two groups of sites can be formed on the basis of these two measurements: LA 25322 and LA 25466 have a smaller usable working edge and a larger area of platform preparation than do LA 25454 and LA 25469. These figures suggest that the occupants of the latter two sites were more efficient in their stone tool production technology and are culturally and possibly temporally distinct from the other two sites. These proportions may reflect a temporal gradient: stone production efficiency has declined through time, the occupants of LA 25454 and LA 25322 being most and least skillful in manufacturing stone tools. Tenuous though they may be, the conclusions on cultural behavior one may draw from such innocuous artifacts are intriguing and worthy of further investigation.

Effects of Inundation Upon Surface Artifact Distributions

One of the major goals of this project was to identify and measure the effects of episodic inundation by Abiquiu Reservoir upon the distribution of artifacts on a site. Such determinations are intended to aid those who must manage and protect the cultural resources which are located within the potential flood pool of the reservoir. Two of the four sites investigated by this project are known to have been greatly disturbed by episodic inundation. It is estimated that approximately 70 and 85 percent of the original site areas at LA 25454 and LA 25469, respectively, have been disturbed if not destroyed by high stands of Abiquiu Reservoir. This juxtaposition of disturbed and more or less

"pristine" artifactual assemblages at these two sites offers the opportunity to examine the differential movement of artifacts.

It was expected that the larger, heavier artifacts such as cores, large flakes, prepared tools, or groundstone would tend to be located very close to their original positions, i.e, prior to inundation. It is recognized that artifactual movement is also affected by gravity, slopewash, freeze/thaw cycles, animal burrowing, and other such natural transformational processes, but their effects were not measured. Light artifacts, such as small flakes, should either be missing (transported completely off the site) or redeposited.

Ten sample units, each unit measuring 25 square meters, were established below the highest reservoir level at LA 25454; at LA 25469, five units, each measuring 16 square meters, were placed in previously inundated areas. All artifacts found within these inundation sample units were inventoried in the same manner as the units which were placed in non-inundated areas. Comparing these two groups of sample units, the most obvious effect of inundation has been to remove most of the lithic remains. The "find" ratios for the non-inundated sample units are 3.6 and 24.4 artifacts/unit for LA 25454 and LA 25469, respectively. Similar ratios for the inundated areas are 2.6 artifacts/unit at LA 25454 and 10.6 artifacts/unit for LA 25469. Tertiary flakes were overwhelmingly predominant in the non-inundated sample units at both sites. In the inundated units, these smaller tertiary flakes were much fewer, and relatively greater frequencies of the larger primary and secondary flakes were recorded. Comparing the mean lengths of all artifacts found in inundated areas to those in units not submerged produces the follow-results:

Mean Length (mm)

	Inundated Units	Non-inundated Units
LA 25454	45.7	34.1
LA 25469	46.1	34.8

Demonstrated is that episodic inundation by Abiquiu Reservoir has greatly affected the pattern and arrangement of surface artifacts at two of the sites investigated by this project. Repeated and/or prolonged inundation of these sites will only exacerbate their degraded conditions. It is also to be expected that higher water levels of Abiquiu Reservoir will have a similar adverse affect upon those sites which have not been inundated previously.

Long Term Adaptive Strategies in the Abiquiu Reservoir Area

Investigation of sites LA 25322, 25454, 25466, and 25469 has provided archaeological data which can be used to examine long term adaptive strategies of the middle Rio Chama Valley. Culture change and continuity are examined primarily in terms of material culture, site

functions and subsistence practices, and inter-site and intra-regional relations. The time span represented at the four sites is from approximately A.D. 550 to A.D. 1925.

Data discussed above and those collected by other investigators suggests that the Abiquiu Reservoir area has been intensively utilized through time. Approximately 343 archaeological sites have been recorded in the immediate vicinity of Abiquiu Reservoir, indicating a relatively high site density. Further, numerous sites, such as LA 25454 and 25469, are horizontally quite extensive, suggesting repeated occupations of individual sites. While use may have been intensive, it appears to have continually been in the form of short-term occupations. The pattern of short-term habitation of sites is characteristic of hunting and gathering cultures, such as those representative of the Archaic Stage, but also appears to have characterized subsequent traditions in the immediate vicinity. Artifacts diagnostic of the Anasazi tradition are present in small in the area, but structural sites are absent, leading Schaafsma (1978) to suggest that the Anasazi utilized the area primarily for hunting and gathering forays. The Riana, Palisade and Tsiping Pueblos were constructed in the vicinity of Abiquiu Reservoir in the early fourteenth century, but these were occupied for only a few decades, and are so few that most of the Piedra Lumbre Valley was undoubtedly used for hunting and gathering purposes. The same pattern is evident during the Navajo Piedra Lumbre Phase. Certain sites, such as the Cerrito site, may have been intensively occupied, but such intensity does not appear to be characteristic of the entire area. Most Piedra Lumbre Phase sites are small and widely scattered. Further, most may have been intermittently occupied, perhaps on a seasonal basis. Excavations by the School of American Research and Nickens and Associates at LA 25322 generally revealed poorly prepared floor surfaces and minimal amounts of accumulated trash. It is possible that continued hunting and gathering practices and the demands of sheep and goats on the local vegetation made it necessary to occupy sites on a rather short term basis. The duration of occupation probably exceeded that of Archaic Stage peoples, as it evidently became cost-effective to construct masonry structures, but may not have exceeded a season.

Historic accounts indicate that the Ute, Apache, Comanche and even early Hispanic settlers utilized the area on a temporary basis. By the late nineteenth century, however, the aboriginal groups in the area had been removed to reservations, permitting Euro-Americans to settle without fear of attack. Site LA 25466 is one such attempt in the Abiquiu Reservoir area; at least 14 other similar sites have been recorded within the Abiquiu Reservoir Multiple Resource Area. While the contemporaneity of the various Hispanic sites has not been established, most appear to have been abandoned for several decades. Presently occupied habitation sites are few in the Piedra Lumbre, and are primarily concentrated near Canones and at the Ghost Ranch.

The Abiquiu Reservoir area was selected for site location for a variety of factors. Archaic Stage peoples were probably drawn by the abundance of raw cherts, which were collected or modified for transport to other areas. Game and floral resources in the area may also have been a factor; perhaps the riparian communities along the Rio Chama and

its major tributaries were extensively exploited. Subsequent Anasazi and Pueblo peoples evidently utilized the area primarily during short-term resource procurement forays, and so probably utilized the area in a manner similar to Archaic Stage peoples. They, like other groups, may have utilized the valley as a route of travel, a factor which might account for utilization of the valley for reasons other than resource exploitation.

With the advent of animal husbandry as an important subsistence practice, other factors were involved in site selection. Factors such as feed for flocks had to be considered, as well as proximity to suitable building materials. The open nature and extersive expanses of grasslands in the valley may have made the area highly desirable to Navajo shepherds. Traditional factors, such as proximity to chert quarries, and wild food sources, may have continued to be considered.

Subsequent occupation of the area by historic aboriginal groups such as the Ute and Apache may have reflected site selection criteria similar to previous hunting and gathering cultures, but also undoubtedly considered the proximity to the trading facilities and Indian Agency at Abiquiu. Hispanic site locations probably reflected factors such as access by draft horses, access to grazing lands and perhaps fields, and easy access to water.

The archaeological data collected on this project suggest that technology remained more stable than might be expected. A lithic industry persisted through the possible Archaic, Navajo, and possibly the Hispanic occupations. Euro-American hardware was available to the various occupants at LA 25322, but none was discovered during excavation. This suggests that such items were rather rare, and were more valued than stone implements. Prepared stone tools were present in insufficient numbers at the four sites to determine the relative importance of tool types.

Considering the presence of stone artifacts at the four sites, it was hypothesized that the lithic industry became less sophisticated through time, as reliance upon Euro-American goods increased. It might be expected, for example, that debitage associated with the Archaic occupations have a higher frequency of prepared platforms, and have longer and narrower flakes. These attributes suggest more efficient exploitation of stone. The hypothesis was not convincingly demonstrated by the data. Frequency of platform preparation remained low at all sites. Flakes at the two non-structural sites, LA 25454 and 25469 were relatively longer in relation to their widths, but possibly not to a statistically significant degree.

Trade networks or perhaps site catchments appear to have been similar at the four investigated sites. All sites yielded obsidian artifacts from a source at Polvadera Peak. The distribution of obsidian from the less well represented sources varies somewhat. Source C (Obsidian Ridge) is represented only at the Euro-American site and source B (Cerro del Medio) is represented only at LA25469. The ceramic types represented at LA 25322 and LA 25469 are similar, and indicate direct or indirect trade with nearby Rio Grande Pueblos. The latter

site also yielded Euro-American ironstone ceramics, some of which were produced as far away as Liverpool, Ohio. This of course evinces a transition into a cash economic system.

Inspection of the archaeological data generated by the investigation of the four sites herein discussed indicates both change in continuity of human behavior's over the past millennium. The occupations represented pre-date and follow a major historical event: the appearance of Euro-American culture in the Southwest. Our data suggest that exploitation of introduced domestic animals occurred rather early, but that traditional subsistence practices and technologies also endured, perhaps even into the early twentieth century.

APPENDIX A

POLLEN AND MACROFLORAL ANALYSES AT ABIQUIU RESERVOIR, NEW MEXICO

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INTRODUCTION

Pollen and macrofloral analyses were undertaken at four sites in the Abiquiu Reservoir Multiple Resource Area in north-central New Mexico. The vegetation in the Abiquiu area varies from short-grass prairie to pinyon/juniper woodland, depending largely on elevation, slope exposure, and soils. Common vegetation within this area includes Pinus edulis (pinyon pine), Juniperus monosperma (one-seeded juniper), Graminae (grasses), Gutierrezia sarothrae (snakeweed), Chrysothamnus nauseosus (rabbitbrush), Atriplex canascens (four-wing saltbush), Xanthium sacaratum (cockle-bur), Artemisia spp. (sagebrush), Lupinus aduncus (lupine), Helianthus spp. (sunflower), Yucca glauca (yucca), and Opuntia spp. (prickly pear cactus). The major source of water for the area is the Rio Chama, which has its headwaters in the San Juan Mountains of southern Colorado. Smaller, ephemeral drainages are noted in arroyos closer to the archaeological sites studied here.

The two prehistoric sites (LA 25454 and LA 25469) were sampled stratigraphically in an effort to assess the paleoenvironment. A single flotation sample was also taken at LA 25469. An early Navajo site (LA 25322) was sampled stratigraphically for subsistence data because the floor of the structure was not discernible during excavation. In addition, samples were collected within trash deposits and on floors at a structural Hispanic site (LA 25466). The analysis of pollen and macrofloral remains from this site was designed to identify subsistence items.

METHODS

Pollen was extracted from soil samples submitted from Nickens and Associates. A chemical preparation based on flotation was selected for removal of the pollen from the large volume of sand, silt, and clay with which they were mixed.

Hydrochloric acid (10%) was used to remove calcium carbonates present in the soil, after which the samples were screened through 150 micron mesh. Zinc bromide (density 2.0) was used for the flotation process. All samples received a short (5 minute) treatment in hot hydrofluoric acid to remove any remaining inorganic particles. The samples were then acetolated for 3 minutes to remove any extraneous organic matter. Samples that contained large quantities of charcoal or humates were treated with Calgon after flotation in zinc bromide. Extensive rinsing with distilled water was required to remove the dissolved humates.

Pollen was identified using a light microscope to count the pollen to a total of 100 or 200 grains per sample at a magnification of [illegible]. Pollen preservation in these samples varied from [illegible]. Comparative reference material collected at the Intermountain [illegible] at Utah State University and the University of [illegible] was used to identify the pollen to the family and genus level, where possible.

AD-A140 677 ARCHAEOLOGICAL INVESTIGATIONS AT FOUR SITES IN THE ABIQUIU MULTIPLE RESOURCE AREA NEW MEXICO(U) NICKENS AND ASSOCIATES MONTROSE CO A D REED ET AL. DEC 83 3/3

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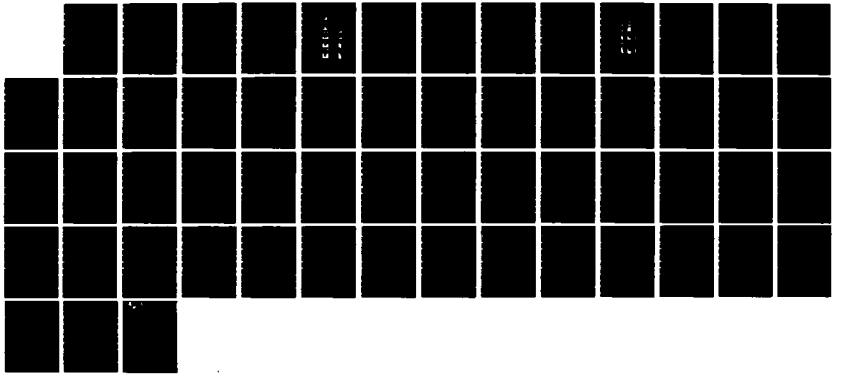

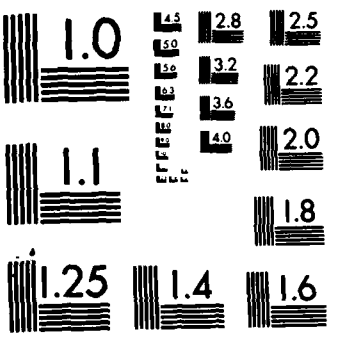

MICROCOPY RESOLUTION TEST CHART
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The flotation samples were floated using a modification of the procedures outlined by Matthews (1977). The samples were measured and floated, after which the floated portion was dried and passed through a series of graduated screens (US Standard Sieves with 4mm, 2mm, 1mm, and .5mm openings) to separate charcoal debris and to initially sort the seeds. The contents of each screen were then measured and examined. The material which remained in the 2mm, 1mm, and .5mm sieves was scanned by Lorraine Dobra, macrofloral consultant to Palynological Analysts, under a binocular microscope at magnifications of 10x or 20x, while the finest material, which passed through the .5mm sieve, was examined under a magnification of 40x.

DISCUSSION

The pollen and macrofloral records from the four sites examined in this study will be presented separately to facilitate discussion. The two prehistoric sites (LA 25454 and LA 25469) will be considered together, as the pollen records for these two sites exhibit the same trends. The two historic sites (LA 25322 and LA 25466) have both been at least partially inundated periodically since the construction of the dam in 1963. The portions of these two sites selected for pollen and macrofloral analysis appear to have been minimally affected by the inundation.

LA 25322--Historic Navajo Site

The pollen record from this site is represented by a present ground surface sample, as well as a stratigraphic column taken within Structure D (Table 27), where no definite floor surface could be discerned. This structure did not exhibit signs of having been inundated. The pollen exhibited in the samples from this site indicates proximity to a pinyon/-juniper environment. Pinus pollen is the primary component of the pollen record (Fig. 52, Table 28). Cheno-ams and Artemisia are also represented in moderate frequencies, apparently representing vegetation at the site and/or in the area. All of the pollen types noted appear to be typical of a pinyon/juniper woodland or an open sparsely vegetated area with a nearby pinyon/juniper woodland. No particularly high frequencies of pollen from plants that may have been exploited economically were noted at the site. A higher than average quantity of high-spine Compositae pollen was noted in the uppermost sample within the structure, but is probably related to the presence of disturbance plants. Sunflowers and other members of the composite family are noted to grow in disturbed areas (Weber 1976), such as in and around abandoned structures. The lowest sample contains a smaller frequency of Pinus pollen and larger quantities of Cheno-am and Artemisia pollen than do the upper samples. It is possible that this may reflect source utilization, such as the cutting of pine, by the occupants of the site, or an increase in weedy (Cheno-am) and sagebrush vegetation near the site during its occupation.

LA 25466--Historic Hispanic Site

The trash area selected for pollen and macrofloral analyses did not

TABLE 27
PROVENIENCE OF POLLEN AND MACROFLORAL SAMPLES FROM ABIQUIU

Sample No.	Provenience	Pollen Counted/ Macrofloral
LA 25322		
5	PGS inside Structure D	400
6	Structure D, 0-10 cm below PGS	300
7	Structure D, 10-29 cm below PGS	200
8	Structure D, 20-30 cm below PGS	100
LA 25466		
1	Feature B, outbuilding, floor surface	200
2	Test Unit 9, trash area, 56 cm below PGS	200
3	Test Unit 9, trash area, 46 cm below PGS	200
4	Test Unit 9, trash area, 36 cm below PGS	100
5	Test Unit 9, trash area, 26 cm below PGS	100
6	Test Unit 9, trash area, 16 cm below PGS	100
7	Test Unit 9, trash area, 6 cm below PGS	200
8	Present Ground Surface	200
9	Feature A, South Room, house floor	200
11	Feature C, North Room, house floor	200
12	Feature A, North Room, house floor	200
13	Feature C, South Room, house floor	200
SS#4	Test Unit 9, trash area 45 cm below PGS	MF
SS#5	Test Unit 9, trash area 30 cm below PGS	MF
SS#6	Test Unit 9, trash area 16 cm below PGS	MF
SS#7	Feature A, South Room hearth contents	MF
SS#8	Feature C, South Room hearth contents	MF
SS#9	Test Unit 4, trash area, Level 4	MF
LA 25454		
1	Present Ground Surface, North half	300
2	Present Ground Surface, South half	300
3	Random Unit 2, North half, 30 cm below PGS	Insuff.
5	Random Unit 2, North half, 20 cm below PGS	Insuff.
7	Random Unit 2, North half, 10 cm below PGS	100
9	Test Unit 5, South half, 40 cm below PGS	200
10	Test Unit 5, South half, 30 cm below PGS	200
11	Test Unit 5, South half, 20 cm below PGS	200
12	Test Unit 5, South half, 10 cm below PGS	200
13	Test Unit 5, South half, pollen wash from inverted metate	200
LA 25469		
1	Present ground surface	300
3	Control Unit 8, 5-10 cm below PGS	200
5	Control Unit 8, 15-20 cm below PGS	100
7	Control Unit 8, gravel 30 cm below PGS	Insuff.
SS#1	Control Unit 4, Level 2, 13 cm below PGS	MF

TABLE 28

POLLEN AND MACROFLORAL TAXA OBSERVED AT ABIQUIU

Scientific Name	Common Name
ARBOREAL POLLEN	
Abies	Fir
Alnus	Alder
Betulaceae	Birch family
Juniperus	Juniper
Picea	Spruce
Pinus	Pine
Pinus edulis	Pinyon pine
Quercus	Oak
Salix	Willow
Ulmus	Elm
NON-ARBOREAL	
Caryophyllaceae	Pink family
Cheno-ams	Members of the goosefoot family and pigweed
Sarcobatus	Greasewood
Amaranthus	Pigweed
Chenopodium	Goosefoot
Cleome	Beeweed
Polansia	Clammy weed
Compositae	Sunflower family
Artemisia	Sagebrush
Low-spine	Includes ragweed, cockle-bur, etc.
High-spine	Includes sunflower, snakeweed, etc.
Cruciferae	Mustard family
Cyperaceae	Sedge family
Ephedra	Mormon tea
Eriogonum	Buckwheat
Euphorbiaceae	Spurge family
Graminae	Grass family
Triticum	Wheat
Labiatae	Mint family
Malvaceae	Mallow family
Opuntia	Prickly pear cactus
Cylindropuntia	Cholla cactus
Polemoniaceae	Phlox family
Polygonaceae	Knotweed family
Ranunculaceae	Buttercup family
Rhus	Sumac
Roseceae	Rose family
Cercocarpus-type	Mountain mahogany
Shepherdia	Buffaloberry
Sphaeralcea	Globe mallow
Typha	Cattail
Umbelliferae	Carrot or parsley family
Zea	Corn

FIGURE 52. POLLEN DIAGRAM FROM LA25466 AND LA25322, ABIQUIU, NEW MEXICO.

exhibit signs of inundation. Both pollen and macrofloral analyses of the trash deposits from this Hispanic site indicate the use of both corn (Zea) and wheat (Triticum aestivum) at this site. Zea pollen was noted in sample #6 (16 cm) from the trash, and Zea mays cob fragments were noted in SS#6 and SS#9, level 4 of the trash (Table 29). Several more corn cobs were recovered during the excavation of Test Unit 9 in the trash. A single cob fragment was noted in level 2, while six cob fragments came from level 3. Level 4 yielded two cob fragments, and level 5 contained a single cob fragment. Gasser (1981:56) indicates that morphological variation in cobs is related, at least in part, to environmental factors. For instance, row number, which has frequently been used as one of the distinguishing racial characters, may be decreased by water stress. For this reason, as well as the fragmentary nature of the Zea mays cobs obtained from these samples, assignment of the cobs to race was not attempted.

Several Triticum (wheat) seeds were noted in soil sample #9 from level 4 of the trash midden and a single Triticum seed was observed in soil sample #6 from 16 cm below the present ground surface in Test Unit 9 of the trash area. The Triticum seeds were all charred. Large Graminae pollen, referable to Triticum pollen, was noted in the trash samples from 16 to 36 cm below the present ground surface. The largest quantities of cf. Triticum pollen concentrated in the samples 26-36 cm below the surface. The large frequencies of wheat pollen in the trash may represent the disposal of chaff or the actual winnowing of the wheat in the vicinity of the trash area.

The pollen samples representing 16-26 cm below the surface in the trash also displayed large quantities of low-spine Compositae (ragweed, cockle-bur) pollen. These plants commonly grow in disturbed areas. Other possible disturbance indicators in the pollen record include Sphaeralcea, which is noted primarily from the samples 26-36 and 16 cm below the surface. The Cheno-am pollen follows a similar distribution to the Pinus pollen and probably reflects a native element of the environment, although it may also respond to disturbance.

Other elements of the macrofloral record from the trash area include charred and uncharred Juniperus scales or leaves, charred and uncharred Amaranthus seeds, a charred Chenopodium seed, and a charred Graminae seed from 16 cm below the surface in Test Unit 9. Charred pine wood was the only vegetal remain noted 30 cm below the surface in Test Unit 9. Charred wood, charred Amaranthus seeds, and 1/2 of an uncharred pine nut (the seed coat) of cf. Pinus aristata or cf. P. longaeva, (not pinyon pine), were observed at 45 cm below the surface in Test Unit 9.

The pollen record from the floors of several rooms differs from that of the trash area. Cheno-am pollen is noted as a large frequency in only one sample from Feature A, North Room, where it probably reflects colonization of the floor after abandonment. Large quantities of low-spine Compositae pollen in Feature B, the outbuilding, and Feature C, South Room also reflect post-abandonment colonization of the floors by weedy plants. The high-spine Compositae pollen from Feature C, South Room, probably also represents the growth of other composites in the disturbed ground. Small quantities of Triticum (wheat) pollen were noted

TABLE 29
MACROFLORAL REMAINS OBSERVED AT LA 25466, LA 25469, AND LA 25322

Sample No.	Provenience	Macrofloral Remains
LA 25469		
SS#1	Control Unit 4, Level 2, 13 cm below PGS	Pine pitch and pine cone scales
LA 25466		
SS#6	Test Unit 9, Trash area, 16 cm below PGS	Charred wood, non-coniferous; charred and uncharred Amaranthus seeds; charred Chenopodium seeds; charred and uncharred Juniperus scales (leaves); charred Graminae seed; charred Triticum seed; charred Zea mays cob fragments
SS#5	Test Unit 9, Trash area, 30 cm below PGS	Charred pine wood
SS#4	Test Unit 9, Trash area, 45 cm below PGS	Charred wood, non-coniferous; charred Amaranthus seeds; charred half pine seed coat (not pinyon)
SS#9	Test Unit 4, Trash area, Level 4	Charred Chenopodium seed; charred Triticum aestivum seeds; charred Zea mays cob fragment
SS#7	Feature A, South Room, hearth contents	Dessicated cf. Cleome or Polansia graveolens seed; uncharred cf. Polygonaceae seed; land snails; ant heads; beetle wing; unidentified charred seed fragment
SS#8	Feature C, South Room, hearth contents	Charred, uncharred, and dessicated Amaranthus blitoides seeds; uncharred cf. Rhus seeds; beetle shells; land snails;
FS 21	Test Unit 1, Level 4	Zea mays cob fragment
FS 26	Test Unit 1, Level 5	Prunus persica (peach) pits (at least 4)
FS 49		Prunus persica (peach) pit (1)
FS 87	Test Unit 9, Level 2	Zea mays cob fragment
FS 94	Test Unit 9, Level 3	Zea mays cob fragments
FS 121	Test Unit 9, Level 4	Zea mays cob fragments (2)

TABLE 29
(Continued)

Sample No.	Provenience	Macrofloral Remains
FS 125	Test Unit 9, Level 5	*Zea mays* cob fragment
FS 95	Feature B, Level 2	*Zea mays* cob fragments (3)
LA 25322		
FS 2	Test Unit 3, Level 1	Uncharred *Pinus edulis* seed coat fragment
FS 11	Structure F, Level 1	Uncharred *Pinus edulis* seed coat fragments
FS 10	Structure F, Level 2	Uncharred *Pinus edulis* seed coat fragments

in the samples from all of the floors. This appears to represent the use of wheat in the structure. Zea pollen was noted only in Feature B, the outbuilding; and Feature C, South Room, where it is also probably associated with use during occupation. Two macrofloral samples from the hearths of Feature A, South Room and Feature C, South Room contained dessicated cf. Cleome (or cf. Polansia), uncharred cf. Polygonacae; and charred and uncharred Amaranthus, and uncharred cf. Rhus seeds respectively. The presence of charred seeds in one of these hearths may represent the utilization of a native plant as food or its accidental introduction with firewood and brush that may have been used as tinder.

Pollen and macrofloral evidence from this site point to the utilization, if not the actual cultivation, of both Zea mays (corn) and Triticum aestivum (wheat) at the site. The presence of whole wheat berries and wheat pollen indicate that if wheat was not cultivated at or near the site it was purchased or obtained prior to being ground, and was subsequently processed at the site. Certain native plants may also have been utilized, including Amaranthus. The charred nature of many of the macrofloral remains from the trash area including charred corn cob fragments, indicates that the trash may have been burned after being deposited, so the fact that seeds are charred or uncharred cannot be used as a specific criterion for indicating utilization.

LA 25454 and LA 25469--Prehistoric Sites

Stratigraphic analysis of sediments from two prehistoric sites was undertaken in an effort to define the paleoenvironment. Site LA 25469 yielded obsidian hydration dates ranging from 750 BP to 4100 BP. The dated obsidian was spread horizontally and vertically throughout the site. No clusterings of dates were correlated with specific depths in the stratigraphic column. Site LA 25454 yielded obsidian hydration dates that clustered around 1400 BP. The obsidian that was dated came from various depths and proveniences, ranging from 50 cm below the present ground surface to the modern surface. Therefore, one may say that the stratigraphic column sampled for pollen is probably not older than 1400 years.

Although pinyon/juniper is the dominant regional vegetation, the specific vegetation at LA 25469 is sparse and consists of scattered grasses (Graminae) and a few junipers (Juniperus). At LA 25454 the vegetation is composed of scattered junipers (Juniperus) along the rim of the terrace, snakeweed (Gutierrezia--a high-spine Compositae), yucca, (Yucca), cholla (Cylindropuntia), and grasses (Graminae). The pollen records (Fig. 53) at these sites exhibit several similarities. Pollen from the pinyon/juniper communities dominate the pollen record at both sites (Fig. 53). At LA 25469 this high arboreal frequency is also observed in the sample taken 5 cm below the present ground surface. But at 15-20 cm, the arboreal pollen has sharply decreased, and the Chenoams, Artemisia, and other Compositae pollen increase. At LA 25454 a decrease in the arboreal pollen is observed at 10 cm below the present ground surface in both the south and north half profiles. The decrease continues in the pollen column from the south half to 20 cm below the surface, and remains relatively stable for the remainder of the column

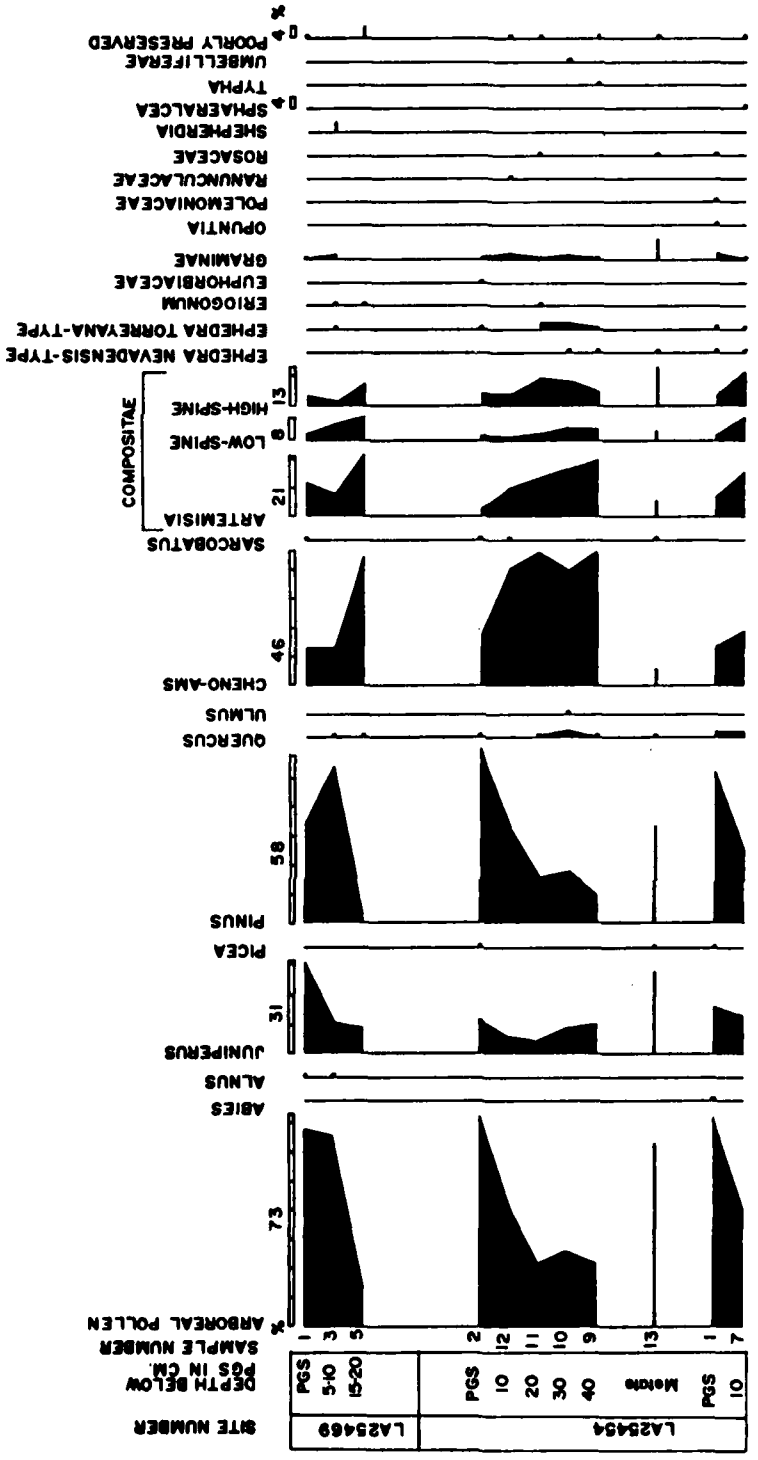

FIGURE 53. POLLEN DIAGRAM FROM LA25469 AND LA25454, ABIQUIU, NEW MEXICO.

(to 40 cm). Concomitant with the decrease in arboreal pollen, which was a decrease almost exclusively in the Pinus pollen at this site, the Cheno-ams and Artemisia pollen increased. To a lesser extent, the low- and high-spine Compositae pollen also exhibited increases.

This pattern of decrease in arboreal, particularly Pinus, pollen appears during the comparison of the modern and past vegetation communities. Sample 3 from LA 25469, taken 5-10 cm below the present ground surface, exhibits a significant portion of modern-looking pollen, indicating that the sample was taken sufficiently close to the surface to incorporate modern pollen, probably introduced into the sample by root action, rain or snow melt percolation, or other natural factors. By contrast, most of the pollen in sample 5 (15-20 cm) were partially deteriorated, indicating that they had not been mixed with more modern pollen. Likewise, at LA 25454, samples 12 and 7, taken at depths of 10 cm below the present ground surface in the south and north halves of the site respectively, exhibit a mixture of modern and deteriorating pollen. It is probable, therefore, that the large frequency of Pinus pollen observed in the samples from the present ground surface at these sites, as well as those samples taken within the upper 10 cm of the stratigraphic column, reflect modern vegetation communities in the vicinity of the sites.

Abiquiu Dam was completed and placed in operation in 1963. Ground cover for the area has been described as sparse, probably the result of soil and available moisture relationships. Portions of the native woodlands were cleared in the recent past in an effort to increase grazing lands (Corps of Engineers, n.d.). A decrease in typical understory and shrub vegetation is noted in the pollen record between the prehistoric past, reflected in samples approximately 15 cm below the present ground surface and lower, and the present and recent historic past. Samples from the upper 10 cm of soil display a mixture of modern and older pollen, and thus reflect, at least in part, the modern vegetation communities. It appears that the large increase in Pinus pollen noted in these recent samples is not representative of an absolute increase in the pinyon pine population in the area, but rather of a decrease in complexity of the vegetation through the elimination of large portions of woodland. The sparse grasses of the grazing areas do not contribute significantly to the regional pollen rain. Pinus pollen has, apparently, become the dominant regional producer of pollen that is distributed long distance by the wind not through an increase in its population, but rather through the decrease in density of other plants in the area.

The pollen record reflects a relatively stable vegetation situation for the past approximately 1400 years at LA 25454 in the lower three samples. The local and regional vegetation appears to have included pinyon/juniper woodland with an understory of Cheno-ams, including saltbush, and small herbaceous plants. Large open areas were probably interspersed where the soil was shallow and supported Cheno-ams and grasses. Sagebrush appears to have been more common in the past than present. It required deeper soils than are observed at these two sites, and may have grown elsewhere in the area, such as in the arroyos or other areas where the soil was deeper. With the introduction of modern pollen into the record, however, a reduction in understory and shrub

vegetation (particularly Cheno-ams) is seen in the present ground surface samples. The reduction of woodland areas and disturbance of the area through livestock grazing and human impact appears to have reduced the Cheno-am population of the area significantly. A slight reduction of the sparse Artemisia (sagebrush) population is also indicated.

A pollen wash from an overturned metate yielded essentially modern pollen. The pollen frequencies in that sample (#13) indicate that water carried elements of the local pollen rain, which consisted largely of Juniperus, Pinus, high-spine Compositae (probably Gutierrezia--snakeweed), and Graminae (grass) and deposited them, along with small amounts of sediment, under the metate.

SUMMARY AND CONCLUSIONS

Pollen and macrofloral analysis of material from two prehistoric and two historic sites in the Abiquiu area indicate that the environment has supported the same major vegetation zones that have been recorded prior to dam construction. Minor fluctuations in the pollen frequencies indicate that the vegetation has remained relatively stable for the past approximately 1400 years. Schoenwetter (1970) in a review of pollen studies of the Colorado Plateau reports only one pollen sequence recovered reflecting a similar time period; that of Picuris Pueblo. In that pollen record the environment is interpreted as relatively moist to average for the past 1400 years, with minor episodes of drying around 1575 to 1875 AD. The few samples analyzed from the Navajo Reservoir District dating post-AD 1500 do not exhibit conditions significantly different than those of today (Schoenwetter 1964; 1966). The largest change in the pollen record in the Abiquiu sites is noted in the present ground surface samples, indicating that dam construction, livestock grazing, and human activities have impacted the area more severely than past environmental fluctuations.

No pollen or macrofloral evidence of subsistence was recovered from the prehistoric sites, or from LA 25322, an early Navajo site. The Hispanic site (LA 25466), however, yielded both pollen and macrofloral evidence that two cultigens--corn and wheat--were utilized at the site. The question of cultivation at or near the site cannot be answered directly from the pollen and macrofloral records. The presence of large quantities of Triticum (wheat) pollen in the trash suggests that if it was not grown at or near the site, it was processed (possibly winnowed and ground) at the site. The purchase and use of ground wheat would not be expected to introduce whole wheat berries and large quantities of wheat pollen into the site. Only small quantities of Zea pollen were observed at this site, which also cannot provide an answer to the question of corn cultivation by the occupants of the site. Corn did, however, arrive "on-the-cob" at the site, as is evidenced by the presence of corn cobs in the trash. Peach pits recovered from the trash also indicate that peaches were available, at least by trade, to the occupants of this site. The utilization of native resources by the Hispanic occupants of this site is suggested by the presence of charred Amaranthus blitoides seeds from one hearth. Exploitation of the native environment and either cultivation of or trading for cultivated foods is indicated at the Hispanic site through the combined pollen and macrofloral records.

APPENDIX B

CATALOG OF COLLECTED ARTIFACTS

CATALOG OF ARTIFACTS
SITE LA25322

F.S. No.	Surface Artifact No.	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping Station *	Item	Figure Reference
1		T.U. 2	1				1 chert core	
2		T.U. 3	1				modern organic material	
3		T.U. 6	2				4 chert interior flakes	
4		T.U. 6	1				1 chert interior flake	
5		T.U. 1	1				1 chert secondary flake	
6		T.U. 3	1				2 chert interior flakes	
							1 chert core	
7		T.U. 4	2				2 chert interior flakes	
8		T.U. 10					1 chert interior flake	
							1 chert secondary flake	
9		T.U. 10	2				1 chert interior flake	
10		Feat. F	2				modern organic material	
11		Feat. F	1				modern organic material	
12		T.U. 9	1				2 chert interior flakes	
13		T.U. 9	3				1 selenite rock	
14		T.U. 6	3				1 chert interior flake	
15		T.U. 6	2				2 chert interior flakes	
16		T.U. 9	3				1 chert interior flake	
17		T.U. 7	1				1 chert secondary flake	
18	2			47	34.5	9	1 chert interior flake	
	5			50	25.2	9	1 chert interior flake	
	6			51	23.7	9	1 chert interior flake	
	7			53	24.1	9	1 chert interior flake	
	8			55	23.8	8	1 chert primary flake	
	9			57	23.8	9	1 chert primary flake	
	10			63	25.3	9	1 chert secondary flake	
	11			63	24.9	9	1 chert interior flake	
	12			64	25.3	9	1 chert interior flake	
	14			61	26.4	9	1 chert secondary flake	
	15			61	26.6	9	1 chert secondary flake	
	18			51	40.1	9	1 chert interior flake	
	19			51	40.1	9	1 chert interior flake	
	20			51	40.1	9	1 chert interior flake	
	21			49	18.7	9	1 obsidian interior flake	
	22			44	18.9	9	1 chert interior flake	
	23			41	17.3	9	1 chert interior flake	

CATALOG OF ARTIFACTS
SITE LA 25322

F.S. No.	Surface Artifact No.	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping Station *	Item	Figure Reference
18	24			41	16.9	1	1 chert interior flake	
	25			41	16.5	1	1 chert interior flake	
	26			41	16.9	1	1 chert flake	
	27			230	9.8	1	1 chert interior flake	
	28			235	11.3	1	1 chert flake	
	29			282	10.8	1	1 chert interior flake	
	30			304	13.8	1	1 chert primary flake	
	31			310	16.2	1	1 chert interior flake	
	32			308	16.3	1	1 chert primary flake	
	33			307	17.3	1	1 chert interior flake	
	34			305	17.1	1	1 chert secondary flake	
	35			311	22.2	1	1 chert interior flake	
	36			356	8.3	1	1 unidentified redware sherd	
	37			3	10.1	1	1 chert interior flake	
	38			0	10.9	1	1 chert interior flake	
	39			59	11.2	1	1 chert scraper	14d
	40			354	10.1	1	1 unidentified redware sherd	
	41			6	11.6	1	1 unidentified redware sherd	
	42			6	11.6	1	1 chert secondary flake	
	43			10	11.5	1	1 chert secondary flake	
	44			10	12.3	1	1 chert interior flake	
	46			355	13.6	1	1 Tewa Red sherd	
	47			352	14.5	1	1 chert interior flake	
	48			352	14.7	1	1 chert secondary flake	
	49			352	15.1	1	1 chert interior flake	
	50			350	15.5	1	1 chert interior flake	
	51			352	16.3	1	1 chert secondary flake	
	52			354	16.7	1	1 chert secondary flake	
	54			358	16.1	1	1 chert interior flake	
	55			358	15.6	1	1 chert interior flake	
	58			344	14.5	1	1 chert biface	14b
	59			344	13.6	1	1 chert interior flake	
	60			335	15.7	1	1 chert biface	14c
	61			340	16.4	1	1 chert secondary flake	
	62			333	16.8	1	1 chert secondary flake	
	65			126	3.0	2	1 chert secondary flake	

CATALOG OF ARTIFACTS
SITE LA 25322

F.S. No.	Surface Artifact No.	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping Station *	Item	Figure Reference
18	66			125	4.3	2	1 chert secondary flake	
	67			126	4.9	2	1 chert core	
	68			119	5.0	2	1 chert primary flake	
	69			116	6.1	2	1 chert core	
	70			116	6.1	2	1 chert secondary flake	
	71			308	8.6	2	1 chert interior flake	
	73			295	14.9	2	1 chert secondary flake	
	74			292	15.0	2	1 chert secondary flake	
	75			0	0	0	1 chert projectile point	14a
19							surface artifacts designated F.S. 18	
20	57			346	14.6	1	1 Tewa B/W sherd	
21		Feat.D Sq.2	2				1 Tewa Red sherd	
23		Feat.D Sq.1	1				1 bone fragment (missing)	
24		Feat.D Sq.2	2				1 artiodactyl bone fragment	
25	53			10	11.5	1	1 unidentified mammal bone	
26	13			50	27.7	9	1 unidentified mammal bone	
27		Feat.D Sq.2	2				1 unidentified mammal bone	

*Key: mapping station
9=datum
1=M.S.1
2=M.S.2

CATALOG OF ARTIFACTS
SITE LA25454

F.S. No.	Surface Artifact No.	Surface Unit*	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping Station	Item	Figure Reference
1		N-44Y						1 chert primary flake	
2		N-683E						1 chert primary flake	
4		N-37U						1 chert primary flake	
								1 chert interior flake	
5		N-1111A						1 chert secondary flake	
6		N-451U						1 chert secondary flake	
7		N-1548U						1 chert primary flake	
8		N-1547U						1 chert interior flake	
9		N-1433Y						1 chert interior flake	
10		N-1598Y						1 chert primary flake	
12		N-1159U						1 chert secondary flake	
								1 chert core	
13		N-1598A						1 chert interior flake	
14		N-1357A						1 chert interior flake	
15		N-1317U						1 chert interior flake	
16		N-1172U						1 chert secondary flake	
17		S-1401A						1 chert secondary flake	
18		N-1122A						1 chert interior flake	
19		N-981Y						1 chert interior flake	
21		N-1398U						2 chert secondary flakes	
25		S-833E						1 chert interior flake	
26		S-833A						2 chert interior flakes	
27		S-833U						2 chert interior flakes	
28		S-274U						2 obsidian interior flakes	
29		S-274Y						4 obsidian interior flakes	
30		S-342Y						1 chert interior flake	
31		S-495X						1 chert interior flake	
32		S-368A						1 chert primary flake	
33		S-368E						1 chert secondary flake	
34		S-368F						1 obsidian scraper	19c
35		S-274A						2 obsidian interior flakes	
36		N-188E						1 chert primary flake	
37		N-1473A						1 chert interior flake	
38		N-1165A						1 chert secondary flake	
39		N-835U						1 obsidian primary flake	
40		N-504Y						1 chert secondary flake	

CATALOG OF ARTIFACTS
SITE LA25454

F.S. No.	Surface Artifact No.	Surface Unit*	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping Station		Item	Figure Reference
41		N-1436U						1	chert interior flake	
42		N-414A						1	chert interior flake	
43					55	102.8		1	chert scraper	
44		N-1436E						1	chert secondary flake	
45		N-273U						1	chert secondary flake	
46					202	25.3		1	obsidian projectile point	19b
47		N-1436Y						1	chert interior flake	
48		N-1297E						1	chert interior flake	
49					286	88.5		1	chert scraper	
50		N-1436A						1	chert interior flake	
								1	chert secondary flake	
51		S-816						1	chert interior flake	
52		S-1159						1	chert primary flake	
53		S-1220E						1	chert interior flake	
54		S-1199Y						1	chert interior flake	
56		S-16P						1	chert interior flake	
57		S-1013E						1	chert primary flake	
								1	chert interior flake	
58		S-620E						1	chert interior flake	
59		S-816A						1	chert primary flake	
60		S-2113U						1	chert interior flake	
61		S-88U						1	chert interior flake	
62		S-726U						1	chert interior flake	
64		S-951E						1	chert secondary flake	
65		S-1050E						1	chert interior flake	
66		S-943A						1	chert interior flake	
67		S-188A						1	chert interior flake	
68		S-247E						1	chert primary flake	
69					325	93.7	2	1	obsidian projectile point	19a
70					120	77.2	1	1	chert biface	19d
71					172	93.2	1	1	chert preform	
72					118	86.2	1	1	chert biface	19e
73		S-1013E						1	chert core	
74					171	103.4	1	1	quartzite scraper	19f
75					192	80.6	1	1	chert core	
76					231	117.0		1	mano	20

CATALOG OF ARTIFACTS
SITE LA25454

F.S. No.	Surface Artifact No.	Surface Unit*	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping Station	Item	Figure Refere
77					11	57.1	2	1 chert core	
78		S-481E						1 chert interior flake	
79		S-273A						11 chert interior flakes	
80		S-273U						8 chert interior flakes	
								1 chert secondary flake	
81		S-273Y						2 obsidian interior flakes	
82		S-273E						2 chert interior flakes	
								2 obsidian interior flakes	
83		S-217E						1 chert interior flake	
84		S-217U						1 chert interior flake	
								1 chert primary flake	
85			R.U. 1	20-45cm				1 chert secondary flake	
87			R.U.10	0				1 obsidian interior flake	
88			R.U.10	1				6 obsidian interior flakes	
								1 obsidian secondary flake	
								1 chert interior flake	
								1 chert primary flake	
89			R.U.10	2				1 chert interior flake	
								1 chert secondary flake	
								1 chert primary flake	
								1 obsidian secondary flake	
90			R.U.15	0				3 chert interior flakes	
								2 chert secondary flakes	
92			R.U.14	1				1 chert secondary flake	
93			T.U. 4	0				1 chert interior flake	
94			T.U. 4	1				1 chert interior flake	
95			T.U. 4	2				3 chert interior flakes	
96			T.U. 2	0				12 chert interior flakes	
97			T.U. 2	1				61 chert interior flakes	
								2 chert secondary flakes	
								1 chert primary flake	
								2 obsidian primary flakes	
98			T.U. 2	2				142 chert interior flakes	
								5 chert secondary flakes	
								1 obsidian interior flake	
								1 chert biface	

CATALOG OF ARTIFACTS
SITE LA25454

F.S. No.	Surface Artifact No.	Surface Unit*	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping Station	Item	Figure Reference
99			T.U. 2	3				231 chert interior flakes 6 chert secondary flakes	
100			T.U. 2	4				7 chert interior flakes	
101			T.U. 3	0				1 chert primary flake 1 chert secondary flake	
102			T.U. 3	1				1 chert primary flake 1 chert interior flake	
103	9				263	67.5	2	1 metate fragment (joins with F.S. 104)	21a
104	10				264	67.5	2	1 metate fragment (joins with F.S. 103)	21b
106			R.U. 3	1				3 chert interior flakes 1 chert secondary flake	
107			T.U. 7	1				2 chert interior flakes	
109			R.U. 2	1				1 chert primary flake 1 chert secondary flake	
110			R.U. 6	0				1 chert interior flake	
111			C.U. 3	1				1 chert interior flake	
112			T.U. 5	0				1 obsidian interior flake	
113			T.U. 5	1				7 obsidian interior flakes 3 chert interior flakes	
114			T.U. 5	2				3 chert interior flakes 3 obsidian interior flakes	
115			T.U. 2	3				9 obsidian interior flakes 4 chert interior flakes 2 chert secondary flakes	
116			T.U. 5	4				1 chert interior flake 5 obsidian interior flakes	
117			C.U. 2	1				1 chert secondary flake	
118			C.U. 6	1				2 chert interior flakes	
119			T.U. 5	5				11 obsidian interior flakes 3 chert interior flakes	
120			C.U. 7	1				2 chert interior flakes	
121			C.U. 8	1				1 chert secondary flake 1 chert interior flake	
122		S-816						1 chert core	

* S prefix indicates a unit on the south half of the site; N prefix indicates a unit on the north half of the site; the number is the unit number and the suffix letter indicates which portion of the unit was collected.

CATALOG OF ARTIFACTS
SITE LA 25466

F.S. No.	Surface Artifact No.	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping Station*	Item	Figure Reference
1		OSOE	2				4 large mammal bones	
2		OSOE	2				1 copper rivet	
3		OSOE	2				1 glass fragment	
4		OSOE	2				1 chert secondary flake	
5		OSOE	3				1 ironstone sherd	
6		OSOE	-				1 glass fragment	
7		OSOE	-				1 obsidian core	
8		T.S. 2	1				14 chert interior flakes	
							1 chert secondary flake	
9		T.S. 1	1				1 glass fragment	
10		T.S. 1	1				2 ironstone sherds	
11		T.S. 1	2				2 mammal bone fragments	
12		T.S. 1	2				3 Tewa Black sherds	
13		T.S. 1	2				1 chert interior flake	
14		T.S. 1	2				1 ironstone sherd	
15		T.S. 1	2				1 cartridge case	43d
16		T.S. 1	3				1 metal fragment	
17		T.S. 1	3				1 mammal bone fragment	
18		T.S. 1	4				4 mammal bone fragments	
19		T.S. 1	4				1 chert primary flake	
							1 obsidian interior flake	
20		T.S. 1	4				4 metal fragments	
21		T.S. 1	4				charred corn cob fragments	
22		T.S. 7	1				1 ironstone sherd	
23		T.S. 1	5				3 ironstone sherds	
24		T.S. 1	5				1 glass fragment	
25		T.S. 1	5				peach pits	
26		T.S. 1	5				sewing chalk	
27		T.S. 1	5				1 chert interior flake	
							1 obsidian interior flake	
28		T.S. 1	5				2 mammal bone fragments	
29		T.S. 1	5				1 Penasco Micaceous sherd	
							1 Tewa Black sherd	
30		T.S. 1	5				1 wagon tongue yoke	
							metal fragments	
31		T.S. 1	6				1 decorated ironstone sherd	
							1 ironstone sherd	

CATALOG OF ARTIFACTS
SITE LA 25466

F.S. No.	Surface Artifact No.	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping* Station	Item	Figure Reference
32		T.S. 1	6				4 mammal bone fragments 1 artiodactyl bone 1 sheep or goat bone fragment	
33		T.S. 1	6				1 Tewa Black sherd	
34		T.S. 1	6				1 leather shoe	
35		T.S. 4	1				1 mammal bone fragment 2 artiodactyl bone fragments	
36		T.S. 4	1				2 ironstone sherds	
37		T.S. 4	2				3 ironstone sherds	
38		T.S. 4	2				zinc plate	
39		T.S. 4	3				1 Tewa Red sherd	
40		T.S. 4	3				2 ironstone sherds	43b
41		T.S. 4	3				2 artiodactyl bone fragments	
42		T.S. 4	3				1 metal button 1 nail 1 tin can fragment	
43		T.S. 4	3&4				plaster	
44		T.S. 4	4				1 mammal bone fragment 1 artiodactyl bone fragment	
45		T.S. 4	4				1 chert drill	45c
46		T.S. 4	4				3 ironstone sherds	
47		T.S. 4	4				4 Tewa Black sherds	
48		T.S. 4	4				2 metal buttons 1 metal rivet 1 metal fragment	
49		T.S. 4	5				peach pits	
50		T.S. 4	5				metal fragments	
51		T.S. 4	5				2 mammal bone fragments	
52		T.S. 4	5				1 Tewa Black sherd 1 Penasco Micaceous sherd	
54		5SOE	1	1			1 chert interior flake 1 obsidian interior flake	
55		5SOE	2				1 Tewa Black sherd	
56		5SOE	3				1 glass fragment	
57		T.U. 3	2				1 chert interior flake	
58		T.U. 3	3				2 chert interior flakes	

CATALOG OF ARTIFACTS
SITE LA 25466

F.S. No.	Surface Artifact No.	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping* Station	Item	Figure Reference
59		T.U. 3	1				2 chert interior flakes	
60		T.U. 2	4				1 chert interior flake	
61		T.U. 2	3				20 chert interior flakes	
							2 chert secondary flakes	
62		5S1E	fill				1 mammal bone fragment	
63		5S0E	fill				6 glass fragments	
64		2S0E	2				14 unidentified bone fragments	
65		T.U. 6	3				1 glass fragment	
66		T.U. 6	3				bone (missing)	
67		2S0E	fill				20 mammal bone fragments	
68		20SE	fill				1 chert primary flake	
69		T.S. 9	3				1 glass button	
70		T.S. 9	3				zinc fragments	
71		T.S. 4	7				1 ironstone fragment	
72		T.S. 4	6				1 nail fragment	
73		T.S. 8	4				1 glass button	
74		T.S. 8	3				1 mammal bone fragment	
75		T.S. 8	3				2 ironstone fragments	
76		T.S. 8	3				2 Tewa Black sherds	
77		T.S. 8	2				1 chert interior flake	
78		T.S. 8	2				1 glass fragment	
79		T.S. 8	2				3 mammal bone fragments	
							1 artiodactyl bone fragment	
80		T.S. 8	2				1 ironstone sherd	
81		T.S. 8	2				1 Tewa Black sherd	
82		T.S. 8	1				1 ironstone sherd, decorated	
83		T.S. 8	1				1 chert secondary flake	
84		T.S. 8	1				1 metal rivet	
85		T.S. 8	1				1 Equus sp. bone	
86		T.S. 9	2				1 glass fragment	
87		T.S. 9	2				1 burned corn cob	
88		T.S. 9	2				1 chert interior flake	
							1 obsidian interior flake	
89		T.S. 9	2				11 ironstone sherds	
90		T.S. 9	3				1 glass fragment	
91		T.S. 9	3				3 mammal bone fragments	

CATALOG OF ARTIFACTS
SITE LA 25466

F.S. No.	Surface Artifact No.	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping Station*	Item	Figure Reference
92		T.S. 9	3				6 Tewa Black sherds	
							1 Tewa Red sherd	
							1 Penasco Micaceous sherd	
93		T.S. 9	3				10 ironstone sherds	
94		T.S. 9	3				corncobs	
95		Feat.B	2				vegetal material	
96		Feat.B	2				1 mammal bone fragment	
							1 artiodactyl molar	
							1 goat or sheep bone	
97		Feat.B	2				4 Tewa Black sherds	
							4 Tewa Red sherds	
							1 Penasco Micaceous sherd	
98		Feat.B	3				5 Tewa Black sherds	
							3 Penasco Micaceous sherds	
99		Feat.B	3				3 mammal bone fragments	
100		Feat.B	3				4 ironstone sherds	
101		Feat.B	2				1 chert interior flake	
102		Feat.B	1				1 chert interior flake	
							1 obsidian interior flake	
103		Feat.B	1				2 mammal bone fragments	
104		Feat.B	1				4 Tewa Black sherds	
							3 Penasco Micaceous sherds	
105		Feat.B	1				4 ironstone sherds, 1 statue base	43a
106		Feat.B	4				2 Tewa Red sherds	
							2 unidentified sherds	
							1 Tewa Black sherd	
107		Feat.B	4				13 metal artifacts	
							1 nail	
							1 tin can fragment	
108		Feat.B	4				1 mammal bone fragment	
109		Feat.B	4				2 glass fragments	
110		Feat.C	1				2 Penasco Micaceous sherds	
111		5S2E	fill				3 chert interior flakes	
112		5S2E	fill				leather shoe fragment	
113		6SOE	3				1 glass fragment	
114		4SOW	fill				1 goat or sheep bone	

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SITE LA 25466

F.S. No.	Surface Artifact No.	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping Station*	Item	Figure Reference
115		2SOW	fill				1 mammal bone fragment	
116		4SOE	fill				1 Tewa Red sherd	
							1 Tewa Black sherd	
117		T.U. 9	7				1 mammal bone fragment	
118		T.U. 9	6				1 Penasco Micaceous sherd	
119		T.U. 9	6				1 leather shoe	
120		6SOE	3				1 chert secondary flake	
121		T.U. 9	4				corncobs	
122		T.U. 9	4				2 mammal bone fragments	
123		T.U. 9	5				1 chert interior flake	
124		T.U. 9	4				1 glass fragment	
125		T.U. 9	5				corncob fragments	
126		T.U. 9	5				1 ironstone sherd	
127		T.U. 9	5				1 metal fragment	
128		T.U. 9	6				5 mammal bone fragments	
129		T.U. 9	5				1 Penasco Micaceous sherd	
							1 Tewa Black sherd	
130		T.U. 9	5				12 mammal bone fragments	
							1 goal or sheep bone	
131		T.U. 9	5				1 leather fragment	
132		T.U. 9	4				3 Tewa Red sherds	
							2 Tewa Black sherds	
							1 Penasco Micaceous sherd	
133		T.U. 9	4				1 ironstone sherd	
134		8S1E	fill				1 glass button	
135		2SOW	floor				1 bottle finish, glass	
137		2S1E	fill				1 mammal bone fragment	
138		2S1E	fill				1 glass fragment	
139		8S1E	fill				1 artiodactyl bone	
140		8S1E	fill				2 obsidian interior flakes	
							1 chert interior flake	
141		9S1E	fill				1 obsidian interior flake	
142		9S1E	floor				1 cartridge case	43c
143		8S2E	fill				1 chert interior flake	
							1 obsidian interior flake	
144		8S2E	fill				10 glass fragments	

F.S. No.	Surface Artifact No.	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping Station*	Item	Figure Reference
145		8S2E	fill				1 Tewa Red sherd	
							1 Penasco Micaceous sherd	
146		6S0W	fill				1 ironstone sherd	
147		6S0W	fill				1 glass fragment	
148		6S0W	fill				1 Penasco Micaceous sherd	
149		6S0E	floor				1 mammal bone	
150		4S2E	fill				1 sheep or goat bone	
151		7S0E	fill				1 Tewa Red sherd	
152		7S0E	fill				1 ironstone sherd	
153		7S0E	fill				1 chert interior flake	
154		4S2E	fill				2 glass fragments	
155		4S1E	fill				1 glass fragment	
156		6S2E	fill				1 Tewa Red sherd	
							1 Tewa Black sherd	
							1 Penasco Micaceous sherd	
157		6S2E	fill				1 chert secondary flake	
158		8S0E	fill				1 Tewa Red sherd	
159		6S0E	floor				1 Tewa Red sherd	
							1 Tewa Black sherd	
							1 Penasco Micaceous sherd	
160		8S0E	fill				1 chert interior flake	
161		7S1E	fill				3 Tewa Red sherds	
162		8S1W	fill				2 ironstone sherds	
163		7S3E	fill				1 leather shoe	
164		5S0W	fill				1 ironstone sherd	
165		5S0W	fill				1 chert interior flake	
166		8S1W	fill				2 chert interior flakes	
							1 chert secondary flake	
167		7S3E	fill				1 glass fragment	
168		5S0W	fill				9 glass fragments	
169		Feat.C N Room SW corner	fill				1 chert interior flake	
170		Feat.G N Room SW corner	fill				1 Tewa Black sherd	

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SITE LA25466

F.S. No.	Surface Artifact No.	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping Station *	Item	Figure Reference
171		7S1W	fill				2 chert interior flakes	
172		7S1W	fill				1 ironstone sherd	
173		Feat.C N Room wall trench	fill				1 obsidian core 1 railroad spike	
174		Feat.C N Room SW corner	fill				1 glass fragment	
175		6N1E	fill				1 decorated ironstone sherd	
176		Feat.A N Room wall trench					tin can fragments	
178		4S0E	fill				5 glass fragments	
179		4S0E					1 chert core	
180		8S0E	fill				1 glass fragment	
181		T.U. 9	4				1 chert interior flake	
182		6S1E	fill				2 chert interior flakes 1 chert primary flake 1 obsidian interior flake	
183		5S0E	fill				2 glass fragments	
184		5S0E	fill				1 chert interior flake	
185		2S0E	fill				1 Tewa Black sherd	
186		5S0E	fill				1 ironstone sherd	
188		5S1E	fill				3 glass fragments	
189		5S1E	fill				1 obsidian interior flake	
190		5S1E	fill				1 Penasco Micaceous sherd	
192		8S1E	fill				2 chert interior flakes 1 chert primary flake	
193		Feat.C N Room wall trench	fill				1 chert interior flake	
194		Feat.A N Room wall trench	fill				4 mammal bone fragments	
195		Feat.A N Room wall trench	fill				1 Penasco Micaceous sherd 1 Tewa Black sherd	

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SITE LA 25466

F.S. No.	Surface Artifact No.	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping Station *	Item	Figure Reference
196		Feat.A N Room wall trench	fill				leather fragment	
197		Feat.A N Room wall trench	fill				1 chert interior flake 1 obsidian primary flake	
199	1			340	12.1	9	1 chert interior flake	
	2			339	12.1	9	1 chert interior flake	
	3			338	12.1	9	1 chert scraper	45b
	5			334	11.5	9	1 chert interior flake	
	7			330	12.5	9	1 chert interior flake	
	8			328	12.5	9	1 chert interior flake	
	9			326	12.2	9	1 chert interior flake	
	10			324	12.4	9	1 chert interior flake	
	13			311	11.7	9	1 chert interior flake	
	14			310	11.4	9	1 chert interior flake	
	15			305	10.6	9	1 chert interior flake	
	16			305	10.6	9	1 chert interior flake	
	17			306	10.7	9	1 chert interior flake	
	18			306	10.9	9	1 chert interior flake	
	19			305	10.9	9	1 chert interior flake	
	20			302	11.0	9	1 chert interior flake	
	21			303	11.1	9	1 chert interior flake	
	22			305	11.4	9	1 chert interior flake	
	23			295	10.6	9	1 chert interior flake	
	24			298	10.6	9	1 chert interior flake	
	26			305	11.9	9	1 chert interior flake	
	27			308	13.4	9	1 chert interior flake	
	28			294	16.8	9	1 chert interior flake	
	30			290	16.9	9	1 chert interior flake	
	31			284	17.2	9	1 chert interior flake	
	32			285	17.4	9	1 chert interior flake	
	33			285	13.9	9	1 chert interior flake	
	36			28	21.4	9	1 chert primary flake	
	37			281	15.2	9	1 chert interior flake	
	38			274	13.1	9	1 chert interior flake	

CATALOG OF ARTIFACTS
SITE LA25466

F.S. No.	Surface Artifact No.	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping Station *	Item	Figure Reference
199	39			275	13.0	9	1 chert interior flake	
	40			224	19.3	9	1 chert interior flake	
	41			224	19.6	9	1 chert interior flake	
	42			190	30.3	9	1 chert secondary flake	
	45			204	45.8	9	1 chert interior flake	
	49			205	45.9	9	1 chert primary flake	
	51			146	16.2	9	1 chert primary flake	
	66			354	11.0	1	1 chert interior flake	
	72			338	14.1	1	1 chert interior flake	
	82			336	18.5	1	1 chert interior flake	
	83			338	17.2	1	1 chert interior flake	
	85			342	19.5	1	1 chert interior flake	
	87			340	20.8	1	1 chert interior flake	
	89			340	22.2	1	1 chert interior flake	
	90			340	19.2	1	1 chert secondary flake	
	91			340	19.3	1	1 chert interior flake	
	92			344	19.4	1	1 chert interior flake	
	93			346	21.4	1	1 chert interior flake	
	103			352	20.2	1	1 chert interior flake	
	104			356	21.0	1	1 chert secondary flake	
	105			356	19.6	1	1 chert primary flake	
	106			356	19.6	1	1 chert interior flake	
	107			26	22.6	1	1 chert interior flake	
	108			228	10.5	1	1 chert interior flake	
	110			222	15.0	1	1 chert primary flake	
	113			202	21.6	1	1 chert secondary flake	
	114			202	21.6	1	1 chert primary flake	
	115			178	24.8	1	1 chert interior flake	
	116			220	23.4	1	1 chert interior flake	
	117			220	25.4	1	1 chert primary flake	
	118			218	24.1	1	1 chert interior flake	
	119			218	24.9	1	1 chert interior flake	
	120			218	24.5	1	1 chert interior flake	
	121			218	25.4	1	1 chert interior flake	
	122			216	29.4	1	1 chert secondary flake	
	123			228	27.9	1	1 chert secondary flake	

CATALOG OF ARTIFACTS
SITE LA25466

F.S. No.	Surface Artifact No.	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping Station *	Item	Figure Reference
199	124			234	22.5	1	1 chert secondary flake	
	125			238	23.8	1	1 chert core	
	126			248	22.9	1	1 chert primary flake	
	127			238	14.7	1	1 chert interior flake	
	128			238	14.1	1	1 obsidian interior flake	
	136			268	16.8	1	1 chert interior flake	
	139			280	21.3	1	1 chert interior flake	
	141			282	23.6	1	1 obsidian interior flake	
	142			282	25.4	1	1 chert secondary flake	
	143			272	26.4	1	1 obsidian interior flake	
	144			250	26.7	1	1 obsidian secondary flake	
	145			250	26.9	1	1 obsidian interior flake	
	146			276	27.4	1	1 obsidian secondary flake	
	147			278	26.8	1	1 chert interior flake	
	148			284	24.0	1	1 obsidian secondary flake	
	149			284	24.6	1	1 chert interior flake	
	151			286	26.1	1	1 obsidian interior flake	
	153			292	29.1	1	1 obsidian interior flake	
	156			302	25.8	1	1 obsidian secondary flake	
	157			310	20.3	1	1 chert interior flake	
	160			316	12.9	1	1 pecked quartzite cobble	46
	161			318	22.3	1	1 obsidian interior flake	
	163			318	32.5	1	1 obsidian biface fragment	45a
	164						1 chert interior flake	
	165						1 chert interior flake	
	166						1 chert interior flake	
	167						1 quartzite secondary flake	
	168						1 chert secondary flake	
200	67			356	11.8	1	1 Penasco Micaceous sherd	
	68			350	12.6	1	1 Penasco Micaceous sherd	
	69			350	12.6	1	1 Tewa Black sherd	
	70			350	13.3	1	1 Tewa Black sherd	
	71			350	13.3	1	1 Tewa Black sherd	
	73			338	14.1	1	1 Tewa Red sherd	
	75			326	15.5	1	1 Tewa Black sherd	
	77			340	16.9	1	1 Tewa Black sherd	

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SITE LA 25466

F.S. No.	Surface Artifact No.	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping Station *	Item	Figure Reference
200	78			334	16.4	1	1 Penasco Micaceous sherd	
	80			334	16.4	1	1 Penasco Micaceous sherd	
	84			338	17.2	1	1 Tewa Black sherd	
	88			338	22.7	1	1 Tewa Black sherd	
	94			342	15.5	1	1 Tewa Black sherd	
	95			342	15.5	1	1 Penasco Micaceous sherd	
	96			342	15.5	1	1 Penasco Micaceous sherd	
	100			342	15.5	1	1 Penasco Micaceous sherd	
							1 Tewa Black sherd	
	101			342	14.4	1	1 Penasco Micaceous sherd	
	111			224	15.1	1	1 Tewa Black sherd	
	129			266	14.2	1	1 Tewa Red sherd	
	130			266	14.2	1	1 Tewa Red sherd	
	131			266	14.2	1	1 Tewa Red sherd	
	132			266	14.2	1	1 Tewa Red sherd	
	133			266	14.2	1	1 Tewa Red sherd	
	134			266	14.2	1	1 Tewa Red sherd	
	135			266	14.2	1	2 Tewa Red sherds	
	136			268	16.8	1	2 Tewa Red sherds	
	138			284	21.2	1	1 Tewa Black sherd	
	162			318	16.2	1	1 Tewa Black sherd	
	169					1	1 Penasco Micaceous sherd	
	170					1	1 Penasco Micaceous sherd	
	171					1	1 Tewa Black sherd	
	172					1	1 Penasco Micaceous sherd	
	173					1	1 Penasco Micaceous sherd	
	174					1	1 Tewa Black sherd	
	175					1	1 Tewa Black sherd	
	176					1	1 Penasco Micaceous sherd	

*9 = Datum

CATALOG OF COLLECTED ARTIFACTS
SITE LA25469

F.S. No.	Surface Artifact No.	Surface Unit	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping Station	Item	Figure Reference
1	29				343	6.9	3	1 obsidian interior flake	
	30				332	6.7	3	1 obsidian interior flake	
	35				358	3.7	3	1 chert interior flake	
	40				61	5.2	3	1 chert interior flake	
	75				120	14.7	3	1 chert interior flake	
	80				150	10.0	3	1 chert interior flake	
	85				160	13.5	3	1 chert secondary flake	
	3001				255	2.7	3	1 chert primary flake	
	3005				176	6.9	3	1 chert interior flake	
	3010				104	3.7	3	1 chert secondary flake	
	3015				16	4.3	3	1 chert interior flake	
	3020				9	6.1	3	1 chert primary flake	
	3025				350	7.2	3	1 obsidian secondary flake	
	3050				110	6.5	3	1 chert interior flake	
	3055				135	6.2	3	1 chert interior flake	
	3060				114	11.6	3	1 chert interior flake	
	3065				89	15.2	3	1 chert core	
	3090				172	11.2	3	1 chert interior flake	
	3096				185	12.0	3	1 chert interior flake	
	3096				185	12.0	3	1 chert interior flake	
	3096				185	12.0	3	1 chert secondary flake	
	3100				190	13.7	3	1 chert primary flake	
	3105				189	13.2	3	1 chert interior flake	
	3110				204	7.2	3	1 chert secondary flake	
	3115				220	9.3	3	1 chert primary flake	
	3116				220	9.3	3	1 chert core	
	3120				269	11.1	3	1 chert primary flake	
	3130				168	17.4	3	1 chert primary flake	
	3135				166	18.4	3	1 chert interior flake	
	3140				171	19.2	3	1 chert interior flake	
2	7001				102	1.6	7	1 chert secondary flake	
	7005				180	7.0	7	1 chert secondary flake	
	7010				143	7.8	7	1 chert interior flake	
	7015				73	4.2	7	1 chert primary flake	
	7020				135	8.7	7	1 chert primary flake	

CATALOG OF COLLECTED ARTIFACTS
SITE LA25469

F.S. No.	Surface Artifact No.	Surface Unit	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping Station	Item	Figure Reference
3	35				298	5.3	1	1 chert interior flake	
	40				298	5.6	1	1 chert secondary flake	
	45				303	5.7	1	1 chert interior flake	
	70				304	7.3	1	1 chert secondary flake	
	75				289	8.8	1	1 obsidian secondary flake	
	125				321	14.1	1	1 chert interior flake	
	1005				238	3.5	1	1 chert interior flake	
	1015				276	4.3	1	1 chert interior flake	
	1020				289	6.7	1	1 chert secondary flake	
	1025				295	5.3	1	1 chert secondary flake	
	1050				306	5.8	1	1 chert primary flake	
	1055				43	5.7	1	1 chert primary flake	
	1060				10	4.7	1	1 chert interior flake	
	1065				332	6.8	1	1 chert core	
	1090				318	10.0	1	1 chert primary flake	
	1095				342	13.2	1	1 chert secondary flake	
	1100				331	13.8	1	1 chert secondary flake	
	1105				332	13.8	1	1 chert secondary flake	
	1110				324	15.1	1	1 chert secondary flake	
	1135				323	16.2	1	1 chert interior flake	
	1140				321	16.1	1	1 chert core	
	1145				322	15.5	1	1 chert secondary flake	
	1155				318	14.2	1	1 chert interior flake	
	1160				317	16.1	1	1 chert interior flake	
	1177				301	12.6	1	1 chert interior flake	
	1180				298	13.1	1	1 chert interior flake	
	1185				290	11.9	1	1 chert interior flake	
	1190				285	11.5	1	1 chert primary flake	
	1205				273	12.8	1	1 chert interior flake	
	1210				268	13.2	1	1 chert primary flake	
	1220				277	16.7	1	1 chert secondary flake	
	1225				206	2.6	1	1 chert interior flake	
	1230				129	2.9	1	1 chert interior flake	
	1235				122	4.5	1	1 chert primary flake	
	1240				98	6.1	1	1 chert primary flake	
	1245				91	6.6	1	1 chert primary flake	

CATALOG OF COLLECTED ARTIFACTS
SITE LA25469

F.S. No.	Surface Artifact No.	Surface Unit	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping Station *	Item	Figure Reference
3	3150				159	18.1	3	1 chert secondary flake	
	3155				144	16.7	3	1 chert interior flake	
	3165				148	21.1	3	1 chert interior flake	
4	5				188	5.7	9	1 chert primary flake	
	15				15	9.9	9	1 chert secondary flake	
	20				145	9.1	9	1 chert secondary flake	
	25				115	5.9	9	1 chert interior flake	
	25				56	6.9	7	1 chert secondary flake	
	30				109	4.2	9	1 chert interior flake	
	30				312	1.0	7	1 obsidian secondary flake	
	40				89	5.6	9	1 chert interior flake	
	50				99	7.1	9	1 primary flake	
	55				100	10.3	9	1 interior flake	
	65				95	9.3	9	1 primary flake	
	70				84	11.4	9	1 chert secondary flake	
	80				83	11.3	9	1 chert secondary flake	
	85				81	11.4	9	1 chert interior flake	
	90				73	5.8	9	1 chert interior flake	
	95				63	8.4	9	1 chert secondary flake	
	100				338	8.7	9	1 chert core	
	101				338	9.2	9	1 chert core	
	105				330	3.8	9	1 chert secondary flake	
	110				317	8.8	9	1 chert primary flake	
	115				316	8.1	9	1 chert interior flake	
	130				315	15.5	9	1 chert core	
	135				320	17.9	9	1 chert primary flake	
	138				280	12.3	9	1 obsidian interior flake	
	140				276	12.1	9	1 chert secondary flake	
	143				270	9.7	9	1 chert secondary flake	
	145				270	18.6	9	1 chert interior flake	
	150				260	14.0	9	1 chert interior flake	
	155				250	13.9	9	1 chert interior flake	
	160				244	5.4	9	1 obsidian core	
	165				232	5.4	9	1 chert primary flake	
	170				231	14.1	9	1 chert core	
	175				228	12.0	9	1 chert interior flake	
	180				225	12.5	9	1 chert interior flake	

CATALOG OF COLLECTED ARTIFACTS
SITE LA25469

F.S. No.	Surface Artifact No.	Surface Unit	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping Station*	Item	Figure Reference
4	184				223	13.4	9	1 obsidian interior flake	
	190				210	12.5	9	1 chert core	
	195				28	7.4	9	1 chert interior flake	
	205				41	6.2	9	1 chert secondary flake	
	210				39	8.0	9	1 chert secondary flake	
	220				46	5.4	9	1 chert core	
	225				44	6.4	9	1 chert secondary flake	
	230				46	5.8	9	1 chert core	
	240				52	5.1	9	1 chert primary flake	
	245				50	6.2	9	1 chert interior flake	
	250				54	4.6	9	1 chert interior flake	
5	5				266	5.5	5	1 chert interior flake	
	20				279	7.0	5	1 chert secondary flake	
	25				277	6.9	5	1 chert interior flake	
	30				274	7.1	5	1 chert secondary flake	
	76				274	9.1	5	1 chert interior flake	
	80				276	11.2	5	1 chert secondary flake	
	87				261	7.3	5	1 chert interior flake	
	90				257	8.3	5	1 chert interior flake	
	105				146	2.0	5	1 chert interior flake	
	110				149	1.0	5	1 chert secondary flake	
	110				149	1.0	5	1 chert interior flake	
	120				25	1.0	5	1 chert primary flake	
	290				191	12.6	5	1 chert primary flake	
	300				204	12.9	5	1 chert secondary flake	
	5035				273	7.3	5	1 chert secondary flake	
	5040				330	7.8	5	1 chert interior flake	
	5046				315	8.5	5	1 chert interior flake	
	5050				299	7.7	5	1 chert interior flake	
	5055				278	7.7	5	1 chert secondary flake	
	5060				297	14.1	5	1 chert secondary flake	
	5065				279	13.0	5	1 chert core	
	5070				273	12.8	5	1 chert primary flake	
	5125				37	2.6	5	1 chert core	
	5130				70	2.6	5	1 chert secondary flake	
	5135				28	1.9	5	1 chert interior flake	
	5140				87	4.4	5	1 chert primary flake	

CATALOG OF COLLECTED ARTIFACTS
SITE LA25469

F.S. No.	Surface Artifact No.	Surface Unit	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping Station	Item	Figure Reference
5	5145				108	3.4	5	1 chert secondary flake	
	5150				115	2.2	5	1 chert interior flake	
	5155				135	4.7	5	1 chert core	
	5160				165	3.4	5	1 chert secondary flake	
	5165				162	7.3	5	1 chert interior flake	
	5170				167	7.9	5	1 chert primary flake	
	5175				173	7.3	5	1 chert interior flake	
	5180				190	6.9	5	1 chert primary flake	
	5200				175	11.1	5	1 chert primary flake	
	5205				175	12.7	5	1 chert secondary flake	
	5210				182	11.9	5	1 chert secondary flake	
	5227				137	10.2	5	1 chert interior flake	
	5230				135	12.9	5	1 chert secondary flake	
	5235				157	13.6	5	1 chert secondary flake	
	5240				170	14.6	5	1 chert secondary flake	
	5250				184	15.9	5	1 chert core	
	5255				190	14.6	5	1 chert interior flake	
	5260				182	15.3	5	1 chert primary flake	
	5271				199	9.5	5	1 chert interior flake	
	5275				206	11.3	5	1 chert secondary flake	
	5280				207	11.4	5	1 chert interior flake	
	5285				190	12.1	5	1 chert primary flake	
7	5				258	2.9	6	1 chert interior flake	
	10				150	0.7	6	1 chert interior flake	
	15				176	6.2	6	1 chert secondary flake	
	20				226	5.9	6	1 chert primary flake	
	60				298	3.8	6	1 chert primary flake	
	120				360	7.8	6	1 chert core	
	6025				182	8.7	6	1 chert secondary flake	
	6030				196	9.0	6	1 chert interior flake	
	6035				218	9.4	6	1 chert interior flake	
	6040				224	12.4	6	1 chert interior flake	
	6045				234	13.6	6	1 chert interior flake	
	6050				244	5.5	6	1 chert interior flake	
	6070				294	5.0	6	1 chert primary flake	
	6080				306	6.3	6	1 chert secondary flake	

CATALOG OF COLLECTED ARTIFACTS
SITE LA25469

F.S. No.	Surface Artifact No.	Surface Unit	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping Station	Item	Figure Reference
7	6085				258	8.5	6	1 chert interior flake	
	6090				248	12.0	6	1 chert primary flake	
	6105				248	13.7	6	1 chert secondary flake	
	6110				333	7.2	6	1 chert primary flake	
	6115				342	5.8	6	1 chert secondary flake	
	6125				45	1.6	6	1 chert interior flake	
	6130				45	0.2	6	1 chert interior flake	
	6133				4	2.2	6	1 chert interior flake	
	6135				6	2.4	6	1 chert interior flake	
	6140				4	2.4	6	1 chert interior flake	
	6145				360	4.0	6	1 chert interior flake	
	6155				2	4.7	6	1 chert secondary flake	
	6160				19	3.2	6	1 chert interior flake	
	6165				20	6.4	6	1 chert primary flake	
	6180				28	6.7	6	1 chert interior flake	
	6185				124	5.4	6	1 chert interior flake	
	6190				123	6.4	6	1 chert secondary flake	
9	105				334	2.3	4	1 chert primary flake	
	115				252	1.5	4	1 chert primary flake	
	120				10	1.9	4	1 chert interior flake	
	230				208	2.6	4	1 chert core	
	240				260	3.6	4	1 chert interior flake	
	245				247	3.9	4	1 chert interior flake	
	250				227	4.5	4	1 chert primary flake	
	4001				264	19.3	4	1 chert core	
	4005				265	14.5	4	1 chert core	
	4010				268	12.3	4	1 chert primary flake	
	4020				286	8.3	4	1 chert secondary flake	
	4035				208	7.3	4	1 chert interior flake	
	4045				236	7.7	4	1 chert primary flake	
					248	7.9	4	1 chert interior flake	
	4050				233	7.1	4	1 chert primary flake	
	4055				217	6.7	4	1 chert interior flake	
	4060				240	6.8	4	1 chert secondary flake	
	4065				242	5.6	4	1 chert secondary flake	
	4070				230	5.1	4	1 chert interior flake	
	4085				286	6.8	4	1 chert interior flake	
	4090				285	6.0	4	1 chert interior flake	
	4095				330	4.5	4	1 chert primary flake	

CATALOG OF COLLECTED ARTIFACTS
SITE LA25469

F.S. No.	Surface Artifact No.	Surface Unit	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping Station	Item	Figure Reference
9	4100				286	4.3	4	1 chert interior flake	
	4125				5	2.5	4	1 chert secondary flake	
	4130				360	4.5	4	1 chert primary flake	
	4135				344	0.6	4	1 chert interior flake	
	4140				30	1.3	4	1 chert interior flake	
	4145				46	0.9	4	1 chert interior flake	
	4150				39	1.3	4	1 chert interior flake	
	4155				55	1.3	4	1 chert interior flake	
	4160				24	5.2	4	1 chert interior flake	
	4170				103	1.9	4	1 chert primary flake	
	4175				112	0.7	4	1 chert interior flake	
	4180				150	1.3	4	1 chert interior flake	
	4185				179	2.2	4	1 chert interior flake	
	4190				156	4.0	4	1 chert primary flake	
	4195				126	3.3	4	1 chert interior flake	
	4200				140	3.7	4	1 chert interior flake	
	4210				150	3.9	4	1 chert interior flake	
	4215				162	5.5	4	1 chert interior flake	
	4220				172	5.7	4	1 chert primary flake	
	4225				219	5.0	4	1 chert interior flake	
	4250				168	4.3	4	1 chert secondary flake	
13			C.U. 2	1				22 grayware sherds	
14			C.U. 2	1				1 chert secondary flake	
								1 chert interior flake	
17			R.U. 1	3				1 obsidian interior flake	
								3 chert interior flakes	
18			R.U. 1	4				2 chert secondary flakes	
								2 obsidian interior flakes	
								2 obsidian secondary flakes	
								1 obsidian primary flake	
19			C.U. 3	1				1 chert primary flake	
								3 chert secondary flakes	
20		58A/L/F						3 obsidian secondary flakes	
								1 obsidian primary flake	
21		102D						2 grayware sherds	
22		102G						1 chert interior flake	

CATALOG OF COLLECTED ARTIFACTS
SITE LA25469

F.S. No.	Surface Artifact No.	Surface Unit	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping Station	Item	Figure Reference
23		96G						2 chert interior flakes	
								1 chert secondary flake	
24		165D						1 chert core	
25		200G						1 chert interior flake	
26		96G						1 chert interior flake	
27		75D						1 chert interior flake	
28		119D						2 chert interior flakes	
29								1 chert secondary flake	
30		119N						1 chert interior flake	
31		56G						2 chert interior flakes	
32		56D						3 chert interior flakes	
33		56F						1 obsidian interior flake	
34		159D						21 chert interior flakes	
								5 chert secondary flakes	
								1 chert primary flake	
35		186N						1 chert core	
								1 chert secondary flake	
								1 chert interior flake	
36		186G						1 chert interior flake	
								2 chert secondary flakes	
37		168N						1 chert core	
38		186D						1 chert secondary flake	
39		116N						2 chert secondary flakes	
40		116D						2 chert secondary flakes	
41		102N						1 chert interior flake	
42		104G						1 chert interior flake	
43		192D						1 chert interior flake	
								1 chert primary flake	
44		80D						1 chert interior flake	
45		104N						2 chert interior flakes	
46		125G						1 chert interior flake	
47		159G						11 chert interior flakes	
								1 chert secondary flake	
								2 chert primary flakes	
48		159N						1 chert core	
								1 chert interior flake	
								1 chert primary flake	

CATALOG OF COLLECTED ARTIFACTS
SITE LA25469

F.S. No.	Surface Artifact No.	Surface Unit	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping Station	Item	Figure Reference
50		192N						1 chert primary flake	
51			R.U. 5	0				2 chert interior flakes	
								1 chert core	
								1 chert secondary flake	
52			R.U. 5	1				1 chert interior flake	
								1 chert secondary flake	
53			R.U. 4	1				1 chert interior flake	
54			C.U. 5	0				2 chert interior flakes	
55			C.U. 5	1				29 chert interior flakes	
								2 chert secondary flakes	
								1 chert primary flake	
								5 obsidian interior flakes	
								1 obsidian secondary flake	
								1 obsidian biface	
56			C.U. 5	1				1 grayware sherd	
57			C.U. 5	2				14 chert interior flakes	
								1 chert secondary flake	
								2 chert primary flakes	
								4 obsidian interior flakes	
								1 obsidian secondary flake	
								2 obsidian primary flakes	
58			C.U. 5	3				1 chert biface	49c
								14 chert interior flakes	
								1 chert secondary flake	
								3 obsidian interior flakes	
59			C.U. 5	3				1 obsidian projectile point	49a
60			R.U. 2	0				1 obsidian interior flake	
61			C.U. 4	0				2 chert interior flakes	
								1 chert secondary flake	
62			C.U. 4	1				1 chert interior flake	
63			C.U. 7	2				29 chert interior flakes	
								3 chert primary flakes	
								8 obsidian interior flakes	
								1 obsidian secondary flake	
								1 chert core	
								1 chert biface	49e

CATALOG OF COLLECTED ARTIFACTS
SITE LA25469

F.S. No.	Surface Artifact No.	Surface Unit	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping Station	Item	Figure Reference
64			C.U. 8	0				1 chert interior flake	
65			C.U. 7	0				1 chert interior flake	
66			C.U. 8	1				1 chert secondary flake	
								7 chert interior flakes	
67			C.U. 7	1				2 chert interior flakes	
68			C.U. 8	1				1 chert secondary flake	
								27 chert interior flakes	
								6 obsidian interior flakes	
69			C.U. 7	1				3 chert secondary flakes	
								10 chert interior flakes	
								1 chert core	
								1 obsidian interior flake	
70			C.U. 8	2				1 chert primary flake	
								2 chert secondary flakes	
								15 chert interior flakes	
								1 chert biface	
								2 obsidian interior flakes	
71			C.U. 8	3				1 chert primary flake	
								1 chert secondary flake	
								32 chert interior flakes	
								2 obsidian secondary flakes	
								7 obsidian interior flakes	
								1 obsidian scraper	
72			C.U. 1	0				8 chert interior flakes	
73			C.U. 1	1				1 chert secondary flakes	
								23 chert interior flakes	
								2 obsidian secondary flakes	
								5 obsidian interior flakes	
74			C.U. 1	2				1 chert primary flake	
								15 chert interior flakes	
								1 obsidian primary flake	
								3 obsidian interior flakes	
75			C.U. 1	3				9 chert interior flakes	
76		58-H						1 obsidian secondary flake	
77		58-K						3 obsidian secondary flakes	
								1 obsidian interior flake	
78		58-C						1 obsidian interior flake	

CATALOG OF COLLECTED ARTIFACTS
SITE LA25469

F.S. No.	Surface Artifact No.	Surface Unit	Excavation Unit	Level	Angle (Degrees)	Distance (m)	Mapping Station	Item	Figure Reference
79		58-J						1 obsidian primary flake	
80		58-M						1 obsidian secondary flake	
								3 obsidian interior flakes	
81			C.U. 3	2				1 obsidian interior flake	
82		102-F						1 unidentified grayware	
83		58-I						1 obsidian interior flake	
84		58-G						1 chert secondary flake	
								9 chert interior flakes	
86		58-D						1 obsidian interior flake	
87		58-D						1 chert primary flake	
								7 chert interior flakes	
88		58-N						2 chert secondary flakes	
								1 chert interior flake	
89		96-N						1 chert interior flake	
90		165-G						1 chert core	
91		58-D						1 chert biface tip	49b
92			C.U. 1	1				1 chert biface	49f
93			C.U. 1	1				1 chert biface base	49d
94		58-D						1 chert biface	

*9 = Datum

APPENDIX C

CATALOG OF ARTIFACTS AND ECOFACTS
COLLECTED AT LA25322 BY PREVIOUS INVESTIGATORS

Catalog No.	Date	Location	Depth	Item
AR33-B-1-1	5-3-79	Midden, near Feature B	0 cm	charcoal
AR33-B-1-2	5-3-79	Midden, near Feature B	0 cm	charcoal
AR33-B-1-3	5-3-79	Midden, near Feature B	0 cm	bone
AR33-B-2-1	5-3-79	Test Pit 2, midden	0-20.0 cm	charcoal
AR33-B-3-1-1	5-4-79	Hogan interior, Feature B	0-20.0 cm	charcoal
AR33-B-2-2	5-4-79	Near Feature B	-	bone
AR33-B-3-1-2	5-3-79	Trench C, Feature B	0-20.0 cm	mano
AR33-B-3-1-3	5-4-79	Feature B, Trench C	10.0 cm	pollen
AR33-B-3-1-4	5-4-79	Feature B, floor & fill	0-20.0 cm	bone
AR33-B-3-1-5	5-4-79	Feature B, floor & fill	0-20.0 cm	pottery
AR33-B-3-2-1	5-4-79	Feature B, S.end of hogan	20.0-40.0 cm	charcoal
AR33-B-3-2-2	5-4-79	Feature B, S.end of hogan	20.0-40.0 cm	bone
AR33-B-3-2-3	5-4-79	Feature B, S.end of hogan	20.0-40.0 cm	pollen
AR33-B-3-3-1	5-4-79	Feature B	40.0 cm	pollen
AR33-B-1-4	5-5-79	Pit 2, Midden, Feature B	0 cm	pottery
AR33-D-3-1	5-5-79	Feature D, hearth	-	charcoal
AR33-D-3-2	5-5-79	Feature D, hearth	8.5 cm	charcoal
AR33-D-3-3	5-5-79	Feature D, hearth	-	bone
AR33-D-1-1	5-5-79	Outside of Feature D	-	charcoal
AR33-D-3-4	5-5-79	Feature D, hearth	-	flotation sample
AR33-D-3-5	5-5-79	Feature D, hearth	-	pollen sample
AR33-D-2-1	5-5-79	Feature D, upper floor surface	-	pollen sample
AR33-G-1-1	5-4-79	14m east of Feature 6	0 cm	projectile point
AR33-1-1	5-3-79	Drainage	0 cm	biface
AR33-H-0-1	5-1-79	Feature H	0 cm	charcoal
AR33-H-1-1	5-1-79	Feature H	0-6.0 cm	charcoal
AR33-H-2-1	5-1-79	Feature H, floor	6.0 cm	charcoal
AR33-H-2-2	5-1-79	Feature H, floor	6.0 cm	pollen
AR33-L-1-1	5-7-79	Feature L, hearth area	0-7.0 cm	charcoal
AR33-L-1-2	5-7-79	Feature L, 1.8m south	0-4.0 cm	wood, ax-cut
AR33-M-1-1	5-7-79	Feature M, hearth area	10.0 cm	pollen
AR33-M-1-2	5-7-79	Feature M, hearth area	10.0 cm	charcoal
AR33-M-1-3	5-7-79	Feature M, hearth area	10.0 cm	charcoal
AR33-S-1-1	5-5-79	Feature S, layer 1	3.0 cm	charcoal
AR33-S-1-2	5-5-79	Feature S, layer 1	7.0 cm	pollen sample
AR33-S-2-1	5-7-70	Feature S, hearth	-	charcoal
AR33-S-2-2	5-7-79	Feature S, hearth	-	organic material
AR33-S-2-3	5-7-79	Feature S, hearth	-	tree-ring specimen
AR33-S-2-4	5-7-79	Feature S, hearth	-	pollen
AR33-S-2-5	5-7-79	Feature S, hearth	-	bone
AR33-S-2-6	5-7-79	Feature S, hearth	-	flotation
AR33-U-1-3	5-7-79	Feature U, hearth	10.0 cm	pollen
AR33-U-1-1	5-7-79	Feature U, hearth	0-10.0 cm	charcoal
AR33-U-1-2	5-7-79	Feature U, hearth	0-10.0 cm	bone
AR33-U-1-4	5-7-79	Feature U, hearth	0-10.0 cm	flotation sample

Catalog No.	Date	Location	Depth	Item
AR33-V-1-1	5-7-79	Feature V, hearth	-	charcoal
AR33-V-1-2	5-7-79	Feature V, hearth	-	pottery
AR33-V-1-3	5-8-79	Feature V, hearth	7.0 cm	pollen
AR33-V-1-4	5-8-79	Feature V	0-7.0 cm	flotation sample
AR33-Z-1-1	5-8-79	Feature Z, hearth	-	charcoal
AR33-Z-1-2	5-8-79	Feature Z, hearth	-	bone
AR33-Z-1-3	5-8-79	Feature Z, hearth	-	flotation sample
AR33-Z-0-1	5-8-79	Feature Z, tree in wall	0 cm	tree-ring sample
AR33-Z-0-2	5-8-79	Feature Z, tree in wall	0 cm	tree-ring sample
AR33-CC-1-1	5-8-79	Feature CC, hearth	0-5.0 cm	charcoal
AR33-CC-1-2	5-8-79	Feature CC, hearth	5.0 cm	pollen sample
AR33-CC-1-3	5-8-79	Feature CC, hearth	0-5.0 cm	flotation sample

APPENDIX D

MEASUREMENTS OF PREPARED CHIPPED STONE TOOLS

SITE LA 25322

F.S. No.	Artifact No.	Item	Provenience		Length (mm)	Width (mm)	Thickness (mm)	Figure Reference
			Horizontal	Vertical				
18	9	Chopper	-	Surface	66	56	25	14e
18	39	Scraper	-	Surface	30	28	13	14d
18	58	Biface	-	Surface	50	50	15	14b
18	60	Biface	-	Surface	31	25	8	14c
18	75	Projectile Point	-	Surface	24	30	5	14a

APPENDIX D
(Cont'd)

SITE LA 25454

F.S. No.	Artifact No.	Item	Provenience Horizontal*	Vertical	Length (mm)	Width (mm)	Thickness (mm)	Figure Reference
34	-	Scraper	S-368F	Surface	28	26	8	19c
43	-	Scraper	102.8 @ 55° from datum	Surface	38	27	7	---
46	-	Projectile Point	25.3 @ 202° from datum	Surface	25	15	3	19b
49	-	Scraper	88.5 @ 286° from datum	Surface	78	53	21	---
69	-	Projectile Point	93.7 @ 325° from M.S.2	Surface	33	19	4	19a
70	-	Biface	77.2 @ 120° from M.S.1	Surface	51	43	13	19d
71	-	Preform	86.2 @ 118° from M.S.1	Surface	77	47	14	---
72	-	Biface	93.2 @ 172° from M.S.1	Surface	58	32	9	19e
74	-	Scraper	103.4 @ 171° from M.S.1	Surface	93	67	41	19f
76	-	Mano	117 @ 231° from M.S.1	Surface	87	81	47	20
103	-	Metate Fragment (joins F.S. 104)	67.5 @ 263° from M.S.2	Surface	230	108	33	21a
104	-	Metate Fragment (joins F.S. 103)	67.5 @ 263° from M.S.2	Surface	150	163	33	21b

* Horizontal provenience: letter "N" or "S" preceding sample unit refers to North Side or South Side, respectively.

APPENDIX D
(Cont'd)

SITE LA 25466

F.S. No.	Artifact No.	Item	Provenience		Length (mm)	Width (mm)	Thickness (mm)	Figure Reference
			Horizontal	Vertical				
45	-	Drill	T.U. 4, Level 3	-	27	27	7	45c
199	3	Scraper	-	Surface	23	8	8	45b
199	163	Biface	-	Surface	23	5	5	45a

APPENDIX D
(Cont'd)

SITE LA 25469

F.S. No.	Artifact No.	Item	Provenience		Length (mm)	Width (mm)	Thickness (mm)	Figure Reference
			Horizontal	Vertical				
*58	-	biface tip	C.U. 5	20-30 cm	35.4	34.4	7.1	49c
59	-	projectile point	C.U. 5	20-30 cm	20.4	16.0	4.2	49a
63	-	scraper	C.U. 7	10-20 cm	40.3	25.0	9.2	49e
91	-	biface tip	58D	Surface	24.0	20.0	4.0	49b
92	-	biface	C.U. 1	0-10 cm	31.4	23.9	5.4	49f
*93	-	biface base	C.U. 1	0-10 cm	43.9	47.8	7.8	49d

[a]Specimens marked with asterisk can be joined to form single artifact.

APPENDIX E

IDENTIFICATION OF FAUNAL REMAINS FROM LA 25466

by

Judith C.H. Andrews

and

Steven Emslie

APPENDIX E

Faunal remains identified at Site LA25466

F.S. #	Taxon	Element
1	Mammalia, large	medial rib fragment; long bone shaft fragment, butcher mark; 2 long bone shaft fragments
11	Mammalia	long bone shaft fragment, burned; unidentified fragment, burned
17	Mammalia	unidentified fragment, burned
18	Mammalia, large Artiodactyla	2 long bone shaft fragments medial ulna fragment; medial right radius fragment molar
28	Mammalia	2 long bone shaft fragments; unidentified fragment
32	Mammalia, large	long bone shaft fragment, butcher mark; long bone shaft fragment; scapula fragment; innominate fragment
	Artiodactyla	right radius shaft fragment, butcher mark
	Ovis-Capra	right mandible fragment
35	Mammalia, large	medial rib fragment, butcher mark
	Artiodactyla	right humerus shaft fragment; medial ulna fragment, butcher mark
41	Artiodactyla	medial ulna fragment; right innominate fragment, burned
44	Mammalia, large Artiodactyla	medial rib fragment medial radius fragment
51	Mammalia, large	medial rib fragment; long bone shaft fragment
62	Mammalia, large	medial rib fragment
64	Mammalia	14 unidentified fragments, burned
67	Mammalia, large Mammalia	7 vertebrae fragments, burned 13 unidentified fragments, burned

APPENDIX E
(Cont'd)

F.S. #	Taxon	Element
74	Mammalia, large	unidentified fragment
79	Mammalia Artiodactyla	3 unidentified fragments, burned left astragalus fragment, burned
85	Equus, sp	left scaphoid
91	Mammalia, large	3 long bone shaft fragments; unidentified fragment, burned
96	Mammalia, large Artiodactyla Ovis-Capra	medial rib fragment, butcher mark molar right radius, proximal end, butcher mark
99	Mammalia, large	long bone shaft fragment, one end appears cut; long bone shaft fragment; unidentified fragment
103	Mammalia, large	unidentified fragment, possible butcher
108	Mammalia, large	unidentified fragment, possible butcher mark; unidentified fragment
114	Ovis-Capra	right humerus fragment
115	Mammalia	unidentified fragment, burned
117	Mammalia, large	medial rib fragment; unidentified fragment
122	Mammalia, large	long bone shaft fragment; dorsal spine, thoracic vertegra
128	Mammalia, large	lumbar vertebra fragment with epiphysis, possibly cut, immature; lumbar vertebra with epiphysis, immature; medial femur fragment; long bone shaft fragment; unidentified fragment, burned
130	Mammalia, large	unknown fragment; scapula fragment; 3 medial long bone shaft fragments; medial rib fragment; 2 unidentified fragments

APPENDIX E

(Cont'd)

F.S. #	Taxon	Element
	Mammalia	rib; medial rib fragment; 2 unidentified fragments
	Mammalia, small	rib fragment
	Ovis-Capra	right innominate fragment
137	Mammalia, large	long bone shaft fragment
139	Artiodactyla	left naviculo-cuboid fragment, burned
149	Mammalia, large	rib
150	Ovis-Capra	right scapula, fragment of head
194	Mammalia, large	thoracic vertebra fragment, immature; 2 medial long bone fragments; unidentified fragment
	Artiodactyla	right ulna, proximal end fragment

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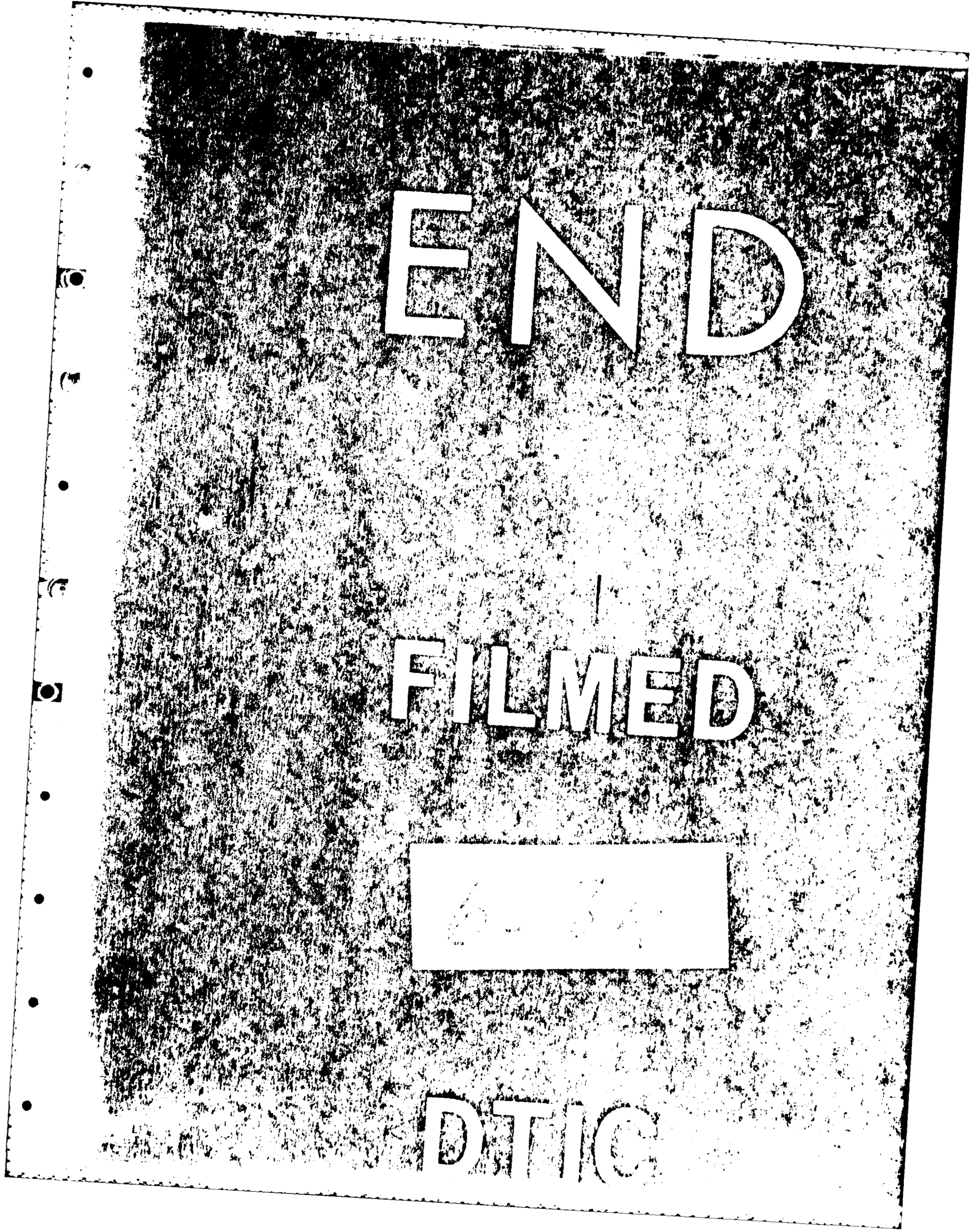
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